

THE IRON AGE

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Mass Manufacture of Lathes

Production Control System, Routing and Mechanical
Handling, and Special-Purpose Equipment
Reduce Costs at Moderate-Sized Plant

BY BURNHAM FINNEY*

THAT methods of mass production successfully used by automobile makers and by other large industrial manufacturers can be adapted to the needs of the machine tool builder in achieving lower operating costs is indicated by the experience of the

Monarch Machine Tool Co., Sidney, Ohio, manufacturer of engine lathes. To enumerate the ways and means by which this company has planned its activities along the lines of quantity output, however, would be telling only part of the story of how production economies and greater shop efficiency have been brought about, because the system for controlling production,

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Part No.

Amount

Size

Lot No.

Part Name

Date Issued

Start in Dept.

Date Rec'd in Stockroom

Date Wanted

Assembly No.

Amount

KEEP TAG WITH WORK

EMPLOYEE'S No.

PART NUMBER

LOT NUMBER

AMT. ON ORDER

AMT. FINISHED

UNIT No.

OPERATION No.

DEPARTMENT

MACHINE No.

FORM C-3 REV. 2-28

SERIALIZED

FOREMAN

FROM

TO

Dept.

Mch.

Unit No.

Part No.

Lot No.

Dept.

Mch.

Amt. on Order

Amt. Finished

Remarks

MOVE CARD

INSTRUCTION SHEET AND
DRAWING ENCLOSED

(At Left) "Work Tag," Which Follows Parts Through Various Operations Until They Reach the Stockroom. In it are put the time cards of the men in the sub-assembly department who have worked on the order

(Upper Right) Time Card, Which Is Filled Out by Workmen and Put Inside the Envelop Known as the Work Tag

(Lower Right) This Card Is Made Out by Department Foremen When Material Is Ready to Be Moved Forward for the Next Operation

Record Kept of Cost of All Sub-Assemblies

Through the comparatively simple record system just described the production department is able to control operations throughout the plant and to have detailed information regarding costs, the amount of finished parts and sub-assemblies on hand and the volume of work in process in the shop. Whenever the time expended on a specific operation is wanted, the department has in its files the time cards of the men who have worked on the job. If a time study is to be made of an operation performed on a new machine or by

THE MONARCH MACHINE TOOL CO.

Assembly Head Apron Carriage
Reverse Plate Gear Box Quadrant

No. 2000

Date

Sold to

Dealer Order No.

Shipped to

Their Order No.

Entered

Promised

Ship Via

DEDUCTIONS
% OF LIST

LIST
PRICES

DISC'T

EXTENSIONS

TOTAL

1—

Countershaft (cone head only)

Large Face Plate

Small Face Plate

Steady Rest

Compound Rest

Centers (two)

Center Sleeve

Chasing Dial

Chasing Stop

Tool Post (complete)

Compound Wrench

Tailstock Wrench

Tailstock

Lead Screw and Half Nuts

Legs—Head End Tail End

Chuck Plate

Chuck Plate Fitted to Chuck

Draw-in Attachment

Oil Pan

Pump and Piping

Taper Attachment

Wiring in Conduit

Mount Motor Drive

Motor

Type

Switch

Type

Chucks

Type

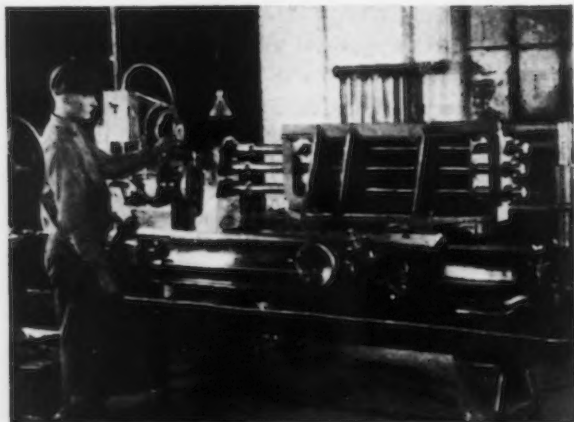
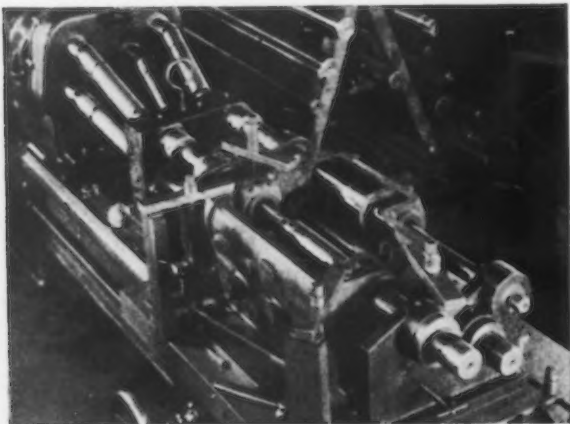
COST DEPT.

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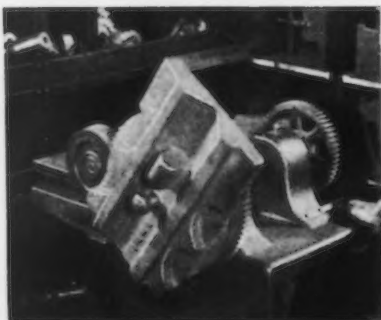
A FACTORY Order Form Is Made Out Whenever New Business Is Booked. Copies of the filled-out form go to the bookkeeper and to the order, production, stock, cost and shipping departments. The copy shown is for the cost department

| ASSEMBLY COST CARD | | | | | | | | | | | |
|--------------------|-----------|---------------|--|-----------------|------|------------|--------|-------------|---------|---------------|--|
| Order No. | | Amount | | Assembly | | | | Description | | | |
| Date | | Our Order No. | | Their Order No. | | From | | To | | | |
| Emp No | Operation | | | Time | Rate | Labor Cost | Burden | Burden Cost | Summary | | |
| | | | | | | | | | | Material Cost | |
| | | | | | | | | | | Labor Cost | |
| | | | | | | | | | | Burden Cost | |
| | | | | | | | | | | Total Cost | |
| | | | | | | | | | | Cost Each | |
| | | | | | | | | | | Remarks: | |

THE Cost of All Sub-Assemblies Is Recorded on an Assembly Cost Card, Which Is Filed by the Production Department. On the back of the card is detailed the cost of all materials going into sub-assemblies

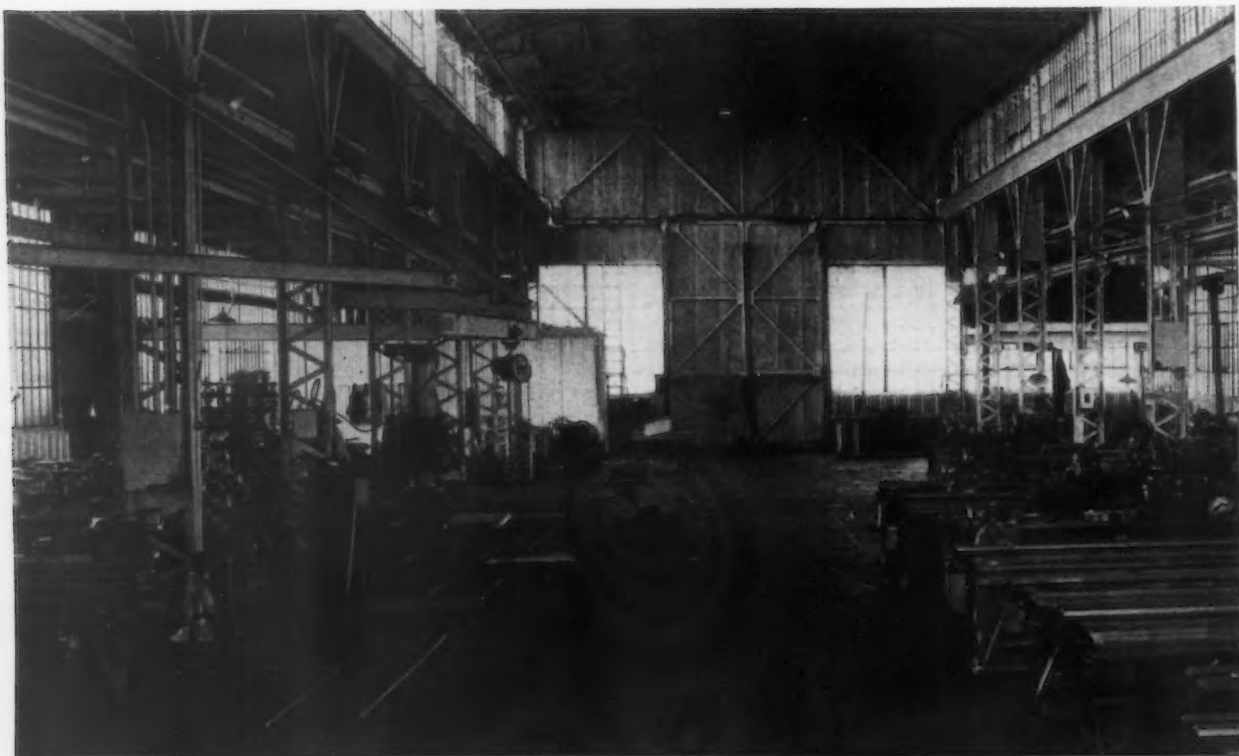


MULTIPLE Boring Is a Feature of the Machine Shop. At upper left, boring seven holes in a headstock at one time on a special boring machine. At upper right, simultaneous boring of 11 holes in a quick-change gear box in the time it takes to bore the largest hole. In upper center, boring three tailstocks at one time



MICROMETER Collars and Other Graduated and Numbered Parts Are Made with Roll Dies on Special Machines (in Lower Center)

Drilling Holes in Lathe Beds Is the Only Machining Operation in the Final Assembly Department (Below). The work is done on a radial drill, shown in the left background. Flat cars, 3 ft. square, on narrow-gage tracks are used to support the ends of a lathe bed when it is put into position for drilling



some other new method, it can be done without disturbing the normal routine of the shop.

Supervisory Committee and Conferences with Foremen Are Features of Management

Formerly it was the custom of the company to have two general superintendents in charge of the plant, but this arrangement resulted in an overlapping of duties which militated against attaining the greatest efficiency. The management, therefore, divided the responsibility by having one of the superintendents take charge of the machining division and the other the assembling division. To consider the formulation of new shop policies and to pass upon all matters of major importance relating to production there is a general supervisory committee consisting of the general manager, assistant general manager, chief engineer and the two superintendents.

Once a week each superintendent has a conference with each foreman under his supervision. In an intimate and informal way the two discuss the work of the men in the department and any other matters pertaining to operating efficiency. This plan puts squarely on the shoulders of the individual foreman his responsibility to the management. It also gives him a voice in discussing and deciding issues affecting his department and encourages him in developing initiative.

Monorail and Lift Trucks Facilitate Handling of Materials

Ample provision has been made in the plant for the mechanical handling of materials. From the receiving shed adjacent to the machine shop a monorail conveyor extends through the shop to the final assembly department. It is used principally to transport lathe beds, and is slightly inclined so that a workman pushing material suspended from it by a chain has an easy task.

For transporting small castings within and between various departments Stuebing-Cowan hand-lift trucks are utilized. Practically all castings, whether light or heavy, are kept on trucks which are stationed alongside the machine operators.

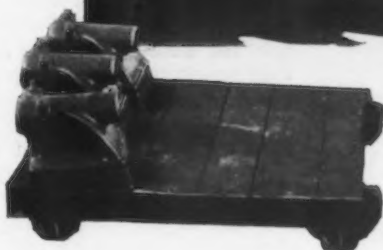
In the sub-assembly department a Louden overhead monorail system parallels the assembly lines, providing adequate means for moving materials. Serving the long bay occupied by the final assembly department is an electric overhead crane operated by rope controls from the floor. The runway of the crane extends over a railroad siding just outside the west end of the building and over the truck loading platform, which occupies a small space at the east end. Two workmen, with the aid of the crane, crate and load all of the lathes shipped by the company.

For drilling holes in the lathe beds, the only machining operation in the final assembly department, material is handled in an unusual manner. Small flat cars, about 3 ft. square, have been placed on a short narrow-gage track extending under and about 10 ft. on both sides of the drill. Whenever a lathe bed is put

into position for drilling, each of the two ends rests on one of the cars, with the middle part of the lathe ready for the drilling operation.

To save time for workmen, the tool room, situated near the center of the shop, has windows on all four sides. Each workman has 10 metal checks. Whenever he applies for a tool, he deposits one of these checks, which is put on the rack from which the tool has been taken. Incidentally, the two men in charge of the tool room not only hand out small tools and jigs to the workmen, but also do all of the graduating on the graduating machines and do considerable tool and cutter grinding.

While parts are produced in quantities, care is exercised to make sure that the volume manufactured at any one time will not clog the stock room and will not



AMPLE Provision for Mechanical Handling of Materials Has Been Made in the Sub-Assembly Department. An overhead monorail system is suspended lengthwise of the assembly lines. Hand-lift platforms, which are transported within and between departments by lift trucks, are also used. One is shown in the foreground

require an inventory out of proportion to the normal amount of business obtained by the sales department. In fact, the number of parts put through on a shop order depends largely on what is the most economical set-up run for each part on each separate operation. Many parts for small-size lathes are run through in lots of 200, while some of the larger parts are put through in lots of only 25 or 50.

Semi-steel lathe beds are rough-planed and rough-milled and are stored for a period of two months for air-seasoning. Over 1500 are being seasoned at all times. After the seasoning process, the beds are finish-planed. All castings are ground, chipped, cleaned and painted by an air-brush system before machining.

Quantity Machining Yields Economies

Among the factors which have been responsible in large part for reducing costs is the time saved by various machining operations. Lathe carriages are milled in a fraction of the time formerly required by planing, large lots being machined at each set-up. Quantity production of clutches is attained on a clutch

milling machine which indexes automatically and is equipped with power rapid traverse between cuts.

Multiple tooling is achieved to a high degree in boring processes. Eleven holes are bored in a quick-change gearbox in the time that is necessary to bore the largest hole, while seven holes are bored in a head-stock at one time on a special boring machine.

Lead screws, rough-chased and seasoned, are finish-chased on lathes fitted with precision screws. Micrometer collars and all other graduated and numbered parts are made with roll dies on special machines, and helical gears are cut by the hobbing process with ground hobs, roughing and finishing cuts being taken. High-carbon alloy steel gears used in Monarch lathes are given the same heat treatment as automobile transmission gears, are tested for hardness and are cleaned by sand blasting.

The final assembly department is divided into three units. The first of these is a small unit in which small junior lathes are assembled, the second is utilized for standard-pattern lathes ranging in size from 14 to 20 in., while heavy duty lathes, varying in size from

20 to 30 in., are assembled in the third. In addition, a special unit is maintained in which lathes intended for single-purpose work are assembled. Each unit is manned by a trained crew of specialists. Every assembling and alining operation is inspected, with 0.001 in. allowed as the limit of error. Experience has shown, however, that the average error is less than half of that amount.

From the assembly department the finished lathe passes to the final painting room where the last coat of lacquer enamel is sprayed on. The company is prepared to furnish lathes in any color which fits into the shop color scheme of its customers.

Each of the factors enumerated has contributed its share to the reduction of manufacturing costs and to increased efficiency of production. Considered as a whole, they have made possible the application to this moderate-sized plant of the methods usually associated with companies annually turning out thousands of units instead of 1000, the average number of engine lathes manufactured annually by the Monarch Machine Tool Co.

Overcoming the Tendency of Enamelled Cast Iron Ware to Blister

Blisters on enameled cast iron ware may be traced either to faulty enamels and process of application or to the castings themselves is the conclusion reached by the metallurgical and ceramic divisions of the United States Bureau of Standards. Recently the bureau has been studying the latter type of blisters. Differences in the blistering tendencies of different sets of castings were clearly brought out by an enameling test which included a variety of firing treatments. Using this test it was found that not only do different irons have different blistering tendencies, but successive heats of the same iron may have different blistering tendencies. The main source of blisters from the irons used in this work was overcome by the removal of a thin surface layer of the castings, through either mechanical or chemical means.

Metal Traffic Through Sault Ste. Marie Canal

Figures of the 1927 commerce passing through the canal of Sault Ste. Marie have been issued by the Corps of Engineers of the United States Army. The total amount of east-bound iron ore is given as 49,963,131 net tons, all of which went through the United States canal. Pig iron shipped eastward through the canals aggregated 78,772 tons, of which 57,900 tons came through the American canal and 20,872 tons through the Canadian canal. Copper to the amount of 67,422 tons came eastward, of which 63,963 tons passed through the American canal.

West-bound iron ore aggregated 134,937 tons, more than 99 per cent of which went through the American canal. Manufactured iron and steel to the extent of 115,502 tons went westward through the canals, of which 82,240 tons traversed the American canal.

High-Pressure Steam Plant Described

Melvin D. Engle of the Edison Electric Illuminating Co. of Boston was the speaker on April 3 before a meeting of the Providence Engineering Society, Providence, R. I. He told of the first commercial use of 1200-lb. steam pressure anywhere in the world. His description was of the Edgar station of the Edison company, which contains, among other things, the largest single-barrel, single-flow, 1800 r.p.m., turbo-generator unit designed for 350 lb. pressure; the largest 1200-lb. pressure turbo-generator; the largest boiler feed pumps, as measured in power required; and the largest under-feed stokers of any plant in the world.

The speaker traced the great improvements of the past two decades in the design and operation of central station equipment. During this period cast iron has been replaced by steel in turbine shells; brass or bronze by steel, monel metal and stainless iron in turbine blades; heat-proof insulating material has been developed, and countless changes have been made in details and in methods of manufacture. Coal consumption has been cut virtually in half, and the use of equipment of large capacity has tended to hold down the capital charge per unit of installed capacity.

Improvement in Welding Electrodes

The Fusion Welding Corporation, which operates as the welding equipment and supply division of Chicago Steel & Wire Co., 103rd Street and Torrence Avenue, Chicago, has completed an engineering and research laboratory. Included are well equipped workrooms supplied with various forms of alternating and direct current for welding, as well as oxy-acetylene cutting and welding equipment, and apparatus for testing of welds. There is also a photographic darkroom equipped with the latest type of metallographic microscope. The laboratory has also been used for instructing select groups of engineers studying some special phases of welding. It is planned to establish full working exhibits, not only at the engineering laboratory in Chicago, but also at the company's offices in New York, Cleveland, Kansas City, Mo., and San Francisco.

Development work recently completed by the engineering department has produced two new mild steel welding electrodes, known as "blue streak" and "yellow jacket." "Blue streak" is a full flux coated electrode and is said to melt more rapidly than the fastest flowing bare wire and, at the same time, having excellent stability. It is especially suited to the welding of the medium and lighter gage plates and sheets. "Yellow jacket" is a surfaced electrode, and is designed to give extreme penetration when used with high current on heavy material. In the laboratory ½-in. mild steel plates have been successfully welded without beveling the edges at a rate of over 20 ft. per hr.

Mechanization of coal mines will be discussed at the April meeting of the Ohio section of the American Institute of Mining and Metallurgical Engineers, to be held in Columbus, April 21. Technical papers will be presented during afternoon sessions at the chapel of Ohio State University. Among the speakers will be J. W. Wilson, Link-Belt Co., Chicago, who will discuss modern coal cleaning methods. The Jeffrey Mfg. Co., Columbus, will present moving pictures of loading and conveying machinery. Registration will be at the plant of the International Derrick & Equipment Co.

Steels Made Under New Conditions

Results of German Tests with a High-Frequency Induction Furnace—Carbonless, Carbon and Alloy Steels Show Unusual Properties—Future Possibilities*

WORK in connection with a high-frequency furnace installation at the Kaiser Wilhelm Institute for Iron Research, Düsseldorf, Germany, during the winter of 1925-26 led to the conclusion that very strong circulation of the metal bath, a fundamental characteristic of the ironless induction furnace, would lead to new working conditions for the basic chemical reactions in producing steel.

The following are the results of a systematic investigation of the capabilities of the high-frequency furnace for producing steel, which demonstrate the improvement that this new type of furnace offers for making alloy steels.

Refining Accelerated in a High-Frequency Furnace

Acceleration of the speed of refining, due to the active bath movement, was observed in several experiments. A steel bath, under a normal refining slag, was brought from 0.14 per cent carbon to 0.03 per cent in 2 min. In another case, a low-carbon stainless steel was produced by adding ferrochrome of 4.8 per cent carbon and 64.9 per cent chromium to a carbon-free bath. Directly after the chrome addition, the melt contained 1.04 per cent carbon and 14.5 per cent chromium. After a refining period of 96 min., the carbon was reduced to 0.16 per cent and the chromium to 13.42 per cent.

A strong bath movement also presents some undesirable factors when melting solid material, due to a "settlement" that forms on the bottom of the furnace, which is constantly turned over with the continually renewed surface taking up oxygen from the furnace atmosphere. For this reason, it is preferable to use fluid charges when using an ironless induction furnace for steel work.

*Abstract of a paper by Franz Wever and Heinz Neuhaus in the *Proceedings of the Kaiser Wilhelm Institute for Iron Research, Düsseldorf, Germany, Vol. VIII, No. 11*. Prepared by William Adams, one of the engineers of the Ajax Metal Co., Philadelphia.

The effect of deoxidation in the strongly circulated bath was investigated by additions of manganese, silicon and aluminum in over-refined heats. The weight of the experimental heats was 40 kg. The additions of metallic manganese, silicon and aluminum were made after the heat was refined to 0.01 to 0.03 per cent carbon, under a lime-fluorspar slag or sand slag. The decrease of the various constituents was determined by continuous sampling, and is shown in Figs. 4 to 9.

In the basic-lined furnace, the silicon and aluminum content fell very quickly, while the manganese fell more slowly. On the other hand, in the acid furnace, the manganese and aluminum decreased rapidly, while the reduction in silicon was somewhat slower. It should be especially noted that the content was reduced to 0.01 per cent and less without the addition of any refining matter. We can conclude from the reduction curves that, as a result of the energetic bath movement, a very rapid reaction is obtained between oxygen combined with the iron and the deoxidizing constituents, and, at the same time, the resulting deoxidized products very rapidly and completely leave the bath and go into the slag—with proper slag procedure.

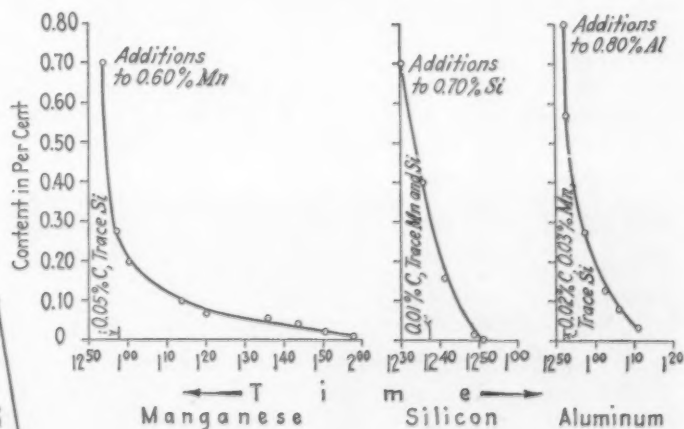
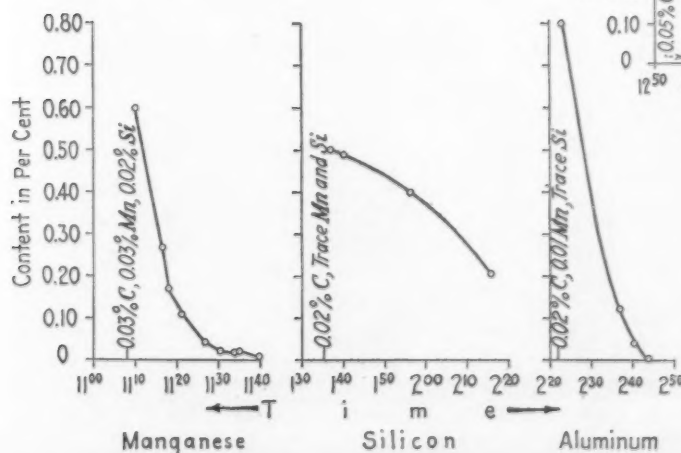
The following described experimental heats were made in a basic furnace lined with magnesite. After melting the charge, two phosphorus slags and finally one sulphur slag were built up.

Carbonless Steel Made in High-Frequency Furnace

A direct proof for the conclusions, made from the above washing-out experiments, is given by heats Nos. 69, 71 and 103 in Table I.

These are completely free of hot-shortness, although they contain only a very small amount of manganese and silicon with the very low-carbon content of 0.01 per cent. The heats Nos. 69, 71 and 103 were poured directly after the washing-out process without adding any further deoxidizing matter, in order to prove that this treatment would make them free of hot-shortness.

Figs. 4, 5 and 6 (Right).—Manganese, Silicon and Aluminum Separations in a Basic Furnace. Silicon and aluminum content fell rapidly



Figs. 7, 8 and 9 (Left).—Manganese, Silicon and Aluminum Separations in an Acid Furnace. Manganese and aluminum percentage decreased rapidly

Bars from these heats, bent at a dull red heat, were eminently satisfactory.

A billet from heat No. 103 was rolled into bars measuring 18 x 4.5 mm. Some of this was also rolled into sheet. Samples of this sheet, in 50 and 100 mm. widths, were cold rolled, 9 to 11 passes, with a speed of 30 meters per minute without heat treatment between the passes, and brought down to 0.2 mm. (90 per cent reduction in area).

Table I—Analysis of Carbonless Steels
(In Per Cent)

| No. of Heats | C | Mn | Si | P | S | Cu | Al | Cr |
|--------------|------|------|------|-------|-------|------|------|-------|
| 69 | 0.01 | 0.17 | 0.15 | 0.015 | 0.033 | 0.10 | 0.01 | ... |
| 71 | 0.01 | 0.13 | 0.15 | 0.014 | 0.017 | 0.09 | 0.02 | ... |
| 103 | 0.01 | 0.14 | 0.22 | 0.010 | 0.010 | 0.05 | ... | ... |
| 95 | 0.01 | 0.46 | 0.22 | 0.005 | 0.017 | ... | ... | ... |
| 99 | 0.02 | 0.49 | 0.22 | 0.006 | 0.013 | ... | ... | 12.67 |
| 105 | 0.01 | 0.52 | 0.23 | 0.010 | 0.012 | ... | ... | 12.22 |
| 102 | 0.16 | 0.43 | 0.09 | 0.008 | 0.049 | ... | ... | 13.42 |
| 106 | 0.15 | 0.44 | 0.17 | 0.010 | 0.020 | ... | ... | 13.20 |

A non-rusting chrome iron (rustless iron), containing very little carbon was also produced (Heat No. 99, Table I). This material was tested at the firm of Sack, Düsseldorf-Rath, after being forged from a 90-mm. square section to a 58-mm. round section. It was turned to 55 mm. diameter and then made into a tube in one operation. The tube, which measured 65 x 3.5 mm., did not show the smallest defect, inside or outside.

In order to verify these good results, heat No. 105, Table I, of the same analysis, was forged and rolled into a tube, 89 x 3½ mm., in two operations, by an automatic machine. The tube was perfectly smooth inside and outside and free from defects, although it had cooled to below 700 deg. at the last operation. After these excellent results from the carbon-free ferrochrome ingot No. 105, the heat No. 106, Table I, containing 0.15 per cent carbon, 13.2 per cent chromium and 0.44 per cent manganese, was given a rolling test. As previously described, this metal had been alloyed with hard ferrochrome and refined from 1.04 per cent carbon to its final content. The ingot, after being forged from a 90-mm. square section to an 88-mm. round section and turned to 75 mm., was readily rolled

into a tube, 76 x 3 mm., in four operations on an automatic machine.

Carbon Steels Made in High-Frequency Furnace

Strong circulation in the ironless induction furnace has still greater advantages for producing higher carbon steels, because in this case the bath may be cleansed of any oxygen with carbon, to form carbon monoxide gas. The method of procedure is as follows: After removing the phosphor slag, pieces of carbon are laid on the bath, and, at the same time, a lime-fluorspar-carbon slag covers the bath surface. The bath movement then continually brings new metal particles in contact with the carbon so that any oxide in the bath is quickly and completely reduced. At the beginning of this process the bath boils considerably, but becomes very calm with increasing deoxidation. The following is a complete charging process:

Charging Process for Heat No. 97

Metal charge—40 kg. tube and sheet scrap, and Krupp soft iron.
8.15 o'clock—Power connected; meter reading 9418 kwhr.
9.55 o'clock—Charge melted; meter reading 9481 kwhr., lime and fluorspar charged.
10.10 o'clock—100 gm. hammer-scales.
10.15 o'clock—First phosphor slag removed; lime and fluorspar charged.
10.25 o'clock—100 gm. hammer-scales.
10.35 o'clock—Second phosphor slag completely removed.
10.36 o'clock—Sulphur slag charged.
(One part charcoal, by weight)
(One part fluorspar, by weight)
(Four parts lime, by weight)
10.40 o'clock—175 gm. carbon electrode material added; bath is turbulent.
10.56 o'clock—First test: 0.37 per cent C, 0.18 per cent Mn. Bath is less turbulent and hot; 153 gm. carbon electrode material added.
11.06 o'clock—Second test: 0.95 per cent C. Bath is very quiet; 70 gm. carbon electrode material added.
11.18 o'clock—Third test: 1.05 per cent C.
11.30 o'clock—60 gm. carbon electrode material added.
11.43 o'clock—58 gm. ferromanganese inserted. (75 per cent Mn., 6 per cent C).
11.46 o'clock—Charge poured in ladle; 7 gm. Al and 40 gm. FeSi (93 per cent Si) added.
Final analysis: 1.32 per cent C, 0.25 per cent Mn, 0.12 per cent Si, 0.013 P, 0.011 per cent S.

Table III—Summation of Repeated Hardening Results

| No. | C | Mn | Si | P | S | As | Cu | Al | O ₂ | No. of hardenings to first level; heating in salt bath and quench in brine | | |
|--------------------------|------|------|------|-------|-------|-------|------|-------|----------------|--|----|----|
| High-Frequency Steel: | | | | | | | | | | | | |
| 61 | 0.82 | 0.39 | 0.26 | 0.013 | 0.018 | ... | 0.08 | 0.02 | ... | 12 | 12 | 13 |
| 58 | 0.93 | 0.16 | 0.14 | 0.013 | 0.024 | 0.02 | 0.16 | 0.01 | ... | 12 | 12 | 12 |
| 98 | 0.93 | 0.27 | 0.17 | 0.030 | 0.020 | ... | ... | Trace | ... | 20 | 20 | 21 |
| 52 | 1.07 | 0.17 | 0.07 | 0.017 | 0.018 | ... | ... | ... | ... | 17 | 18 | 17 |
| 100 | 1.00 | 0.28 | 0.15 | 0.023 | 0.014 | ... | 0.06 | Trace | ... | 18 | 22 | 24 |
| 59 | 1.14 | 0.16 | 0.13 | 0.020 | 0.016 | ... | 0.07 | 0.02 | ... | 17 | 18 | 19 |
| 68 | 1.30 | 0.28 | 0.27 | 0.014 | 0.013 | ... | 0.09 | 0.01 | 0.033 | 27 | 27 | 27 |
| 96 | 1.30 | 0.26 | 0.18 | 0.017 | 0.009 | ... | ... | Trace | ... | 28 | 28 | 29 |
| 97 | 1.32 | 0.25 | 0.12 | 0.013 | 0.011 | ... | ... | Trace | ... | 29 | 31 | 32 |
| Clay Crucible Steel: | | | | | | | | | | | | |
| | 1.11 | 0.64 | 0.26 | 0.026 | 0.032 | ... | 0.10 | Trace | ... | 17 | 19 | 19 |
| | 1.30 | 0.26 | 0.17 | 0.019 | 0.019 | Trace | 0.04 | Trace | ... | 19 | 19 | 20 |
| Graphite Crucible Steel: | | | | | | | | | | | | |
| | 0.94 | 0.34 | 0.19 | 0.010 | 0.038 | 0.020 | 0.12 | 0.018 | ... | 14 | 14 | 15 |
| | 1.19 | 0.38 | 0.22 | 0.016 | 0.040 | 0.019 | 0.12 | 0.024 | Sn | 23 | 24 | 25 |
| Electric Steel: | | | | | | | | | | | | |
| | 0.78 | 0.27 | 0.24 | 0.014 | 0.013 | ... | ... | ... | 0.039 | 9 | 10 | 10 |
| | 1.15 | 0.26 | 0.21 | 0.009 | 0.014 | ... | ... | ... | 0.039 | 25 | 25 | 26 |

Table IV—Bending Strength, Fracture Examination and Hardness of a Ball Bearing Steel with Various Hardenings

| No. | Treat-ment, Oil, deg. C. | Outside Diameter, mm. | Wall Thick-ness, mm. | Length, mm. | Inside Diameter, mm. | Load-ing, kg. | Bending Strength, kg. per sq. mm. | Fracture | Hard-ness, 5/750 | Rockwell, C |
|-----|--------------------------|-----------------------|----------------------|-------------|----------------------|---------------|-----------------------------------|-------------------|------------------|-------------|
| 1 | 780 | 53.92 | 6.00 | 9.92 | 47.92 | 1430 | 183.7 | Fine grain struc. | 241 | 24.3 |
| 2 | 780 | 53.94 | 5.96 | 9.82 | 48.08 | 1630 | 214.8 | Fine grain struc. | 249 | 23.9 |
| 3 | 780 | 53.95 | 5.98 | 9.88 | 47.97 | 1470 | 191.2 | Fine grain struc. | 234 | 27.0 |
| 4 | 800 | 53.91 | 6.02 | 9.96 | 47.89 | 1780 | 226.0 | Very fine | 653 | 63.2 |
| 5 | 800 | 53.97 | 6.02 | 9.94 | 47.95 | 1660 | 211.8 | Very fine | 653 | 63.2 |
| 6 | 800 | 53.94 | 6.02 | 9.92 | 47.92 | 1830 | 233.5 | Very fine | 653 | 63.8 |
| 7 | 820 | 53.98 | 6.00 | 9.95 | 47.98 | 1150 | 147.3 | Satiny | 653 | 64.5 |
| 8 | 820 | 53.98 | 5.97 | 9.96 | 48.01 | 1520 | 196.5 | Satiny | 653 | 65.1 |
| 9 | 820 | 53.97 | 6.00 | 9.90 | 47.97 | 1340 | 172.8 | Satiny | 653 | 65.3 |
| 10 | 840 | 53.94 | 5.94 | 9.89 | 48.00 | 1170 | 154.0 | Fine grain | 653 | 66.7 |
| 11 | 840 | 53.95 | 5.96 | 9.93 | 47.99 | 1290 | 167.9 | Fine grain | 653 | 66.6 |
| 12 | 840 | 53.95 | 5.97 | 9.93 | 47.98 | 1100 | 143.1 | Fine grain | 653 | 66.4 |
| 13 | 860 | 53.98 | 5.96 | 9.95 | 48.02 | 1040 | 135.2 | Fine grain | 653 | 67.9 |
| 14 | 860 | 53.93 | 5.95 | 9.90 | 47.98 | 1040 | 136.1 | Fine grain | 653 | 67.7 |
| 15 | 860 | 53.95 | 5.98 | 9.88 | 47.97 | 980 | 127.3 | Fine grain | 653 | 66.9 |
| 16 | 880 | 53.97 | 6.00 | 9.96 | 47.97 | 1045 | 134.9 | Partly overheated | 653 | 68.2 |
| 17 | 880 | 53.96 | 5.98 | 9.98 | 47.98 | 1040 | 134.0 | Partly overheated | 653 | 66.9 |
| 18 | 880 | 53.96 | 5.97 | 9.97 | 47.99 | 1060 | 136.5 | Partly overheated | 653 | 66.7 |

Due to the tendency of the bath movement to pull the slag to the side walls, it was necessary to work with a comparatively thick slag covering. The temperature conditions in the small experimental furnace were also unfavorable for maintaining a white slag. In order that the results may be valued correctly, it should be borne in mind that in these experiments the bath was always over-refined after being melted down. As the heats No. 70 and No. 72 show, the over-refined metal may be brought back completely by deoxidation using a layer of carbon under a thick lime-fluorspar-carbon slag. In spite of the small manganese content (0.05 to 0.06 per cent), both heats were free of all hot-shortness. The carbon in the two heats was 1.14 and 0.84 per cent respectively, silicon, 0.23 and 0.19 per cent; phosphorus, 0.011 and 0.006 per cent, and sulphur, 0.005 and 0.007 per cent.

In order to arrive at some numerical expression for comparing the quality of the carbon steels melted with clay crucible, graphite crucible and electric steels, the Maurer repeating hardness test was used. A series of carbon steels of similar analyses were melted as outlined by the work of Maurer and Haufe (E. Maurer and W. Haufe, *Stahl und Eisen*, Vol. 44, 1926).

The test pieces measured 20 mm. square and 85 mm. long. They were notched in the middle of one side, the notch being 1.5 mm. wide and 3 mm. deep and perpendicular to the long axis. They were then hardened in brine to the first hardening level of 780 deg. C.

In order to test the sensitiveness of the steel against overheating, experiments were made with pieces hardened at temperatures between 760 and 950 deg. C. As a whole, the steels in Table III showed very little sensi-

tiveness to overheating. In all pieces fractured, the fine grain lies inside of the hardened outer layer.

Tests on a Hard Alloy Steel

As an example for a hard alloy steel, a chrome ball bearing steel of the following analysis was melted:

(Heat No. 75) 1.18 per cent C., 0.46 Mn., 0.09 per cent Si., 1.45 per cent Cr., 0.02 per cent P., 0.012 S., 0.072 per cent O₂.

This was made into a tube, 55½ x 39 mm. Table IV shows the bending strength, fracture examination and hardness at various hardenings. The metallographic examination also showed a material free of all objections.

Similar Results Expected in Large Furnaces

The foregoing results of melting experiments up to the present time lead to the conclusion that the ironless induction furnace will play an important part in any further development of the electric alloy steels. These results are not to be attributed to a special working procedure attainable only in the laboratory, because we believe the main reason for the high excellence of the high-frequency steel is due to the fundamental improvement in the physical and chemical conditions brought about by the bath circulation.

These metallurgical fundamentals will remain the same in larger furnaces. Therefore, it is believed possible to transfer the results into large operations. The difficulty encountered when working with small furnaces due to the unfavorable relation of the working opening to the total top surface will be greatly improved with larger units.

Condenser Units with Self-Cleaning Surfaces

The Griscom-Russell Co., New York, has developed a new surface condenser or cooler unit, known as the G-R Bentube section. Essentially, each section consists of two cast iron headers fixed rigidly at proper distances apart by angle irons or other structural members. Between these headers are a series of admiralty metal tubes, somewhat too long for the intervening space. Each tube therefore possesses initially a slight bow, deviating from a straight line.

In operation the hot gas or liquid to be cooled enters the unit by one header, thence through the tubes to the other header, and from there to other Bentube units in series, or is returned to the main circulating system. Hot liquids inside the tubes cause them to expand in length, and increase the sidewise bow or curve. This change in curve with changing temperature is said to be sufficient to flake off any scale collecting on the outside of the tubes from the evaporation of the cooling water, which may therefore be quite hard or dirty.

Commercial Stocks of Industrial Coal Becoming Smaller

Estimates of the National Association of Purchasing Agents place the supply of coal in various industries at 26 days for steel mills, 36 days for by-product coke plants, 37 days for railroads, 51 days for electric and gas utility plants and 37 days for other industries. The total is given at 47,388,000 tons on March 1, compared with 50,595,000 tons Feb. 1. There has been a steady reduction since Oct. 1, when the total was 60,154,000 tons. Industrial consumption during February was placed at 36,301,000 tons, a drop of more than 3 per cent from the January total of 37,678,000 tons.

With only one more week of the coal year yet to hear from, estimates of the total production of the year ended March 31 include 480,000,000 tons of bituminous coal, compared with 600,000,000 tons a year ago. The figures are based on the latest reports from the United States Bureau of Mines. In anthracite, the coal year will show an output of about 78,700,000 tons, compared with nearly 92,000,000 tons last year.



Cooling Bed for Oil Vapors, Built of "Bentube" Sections

Chrome-Molybdenum Steel



SUCCESSFUL spanning of the Atlantic from East to West by the German-Irish flyers focuses attention on the importance of alloy steels in airplane construction. The steel described in this article made up the framework of the famous Lindbergh plane and of other planes which have made epoch-making flights in the last year.

BY J. B. JOHNSON*

THE survival of any alloy steel in the keen competition of commercial application depends upon the superior properties which the steel may have for performing any particular service. This is particularly true when it is used in aircraft construction. Aeronautical engineers are forced to conserve weight by the very nature of the conditions under which the airplane operates. Such conservation can be effected by using steels with a high strength-weight ratio and by designing members to utilize the material most economically. The former is obtained with heat-treated alloy steels and the latter by using shapes with a large moment of inertia, connected together by simple joints. A large moment of inertia is obtained by using hollow or built-up sections of thin material.

The most popular form of structural member is a seamless tube. Tubing of either circular or square cross-section can be readily adapted to the truss or bridge type of construction, which is almost universally used in modern aircraft. A carbon steel tube was used in the original airplanes and is still extensively used on the small commercial airplanes. With the increase in size of the airplane and the higher factors of safety demanded by the increase in horsepower of the engines, an alloy steel tubing is more economical of weight and more uniform in quality.

Three and one-half per cent nickel and nickel-chromium steels were utilized when the use of alloy tubing was confined to straight axles with a comparatively low ratio of diameter to wall thickness. These axles were heated during fabrication to develop a tensile strength of 200,000 lb. per sq. in., with a minimum elongation of 5 per cent, and were entirely satisfactory for the purpose.

With the more extended use of alloy steel tubing in the structure, however, it was found desirable to develop other alloys which could be more economically manufactured in very thin gages and large diameters, that is, with a large ratio of diameter to wall thickness, and which could be welded without a great reduction in tensile strength. Steel containing chromium and vanadium as the alloying elements could not be cold-drawn to the ratio desired without excessive waste, but the substitution of molybdenum for vanadium overcame this difficulty. Chrome-molybdenum

steel is being used in the automotive industry for axles, torque tubes and other highly stressed parts, and its adaptation to aircraft use was a logical development.

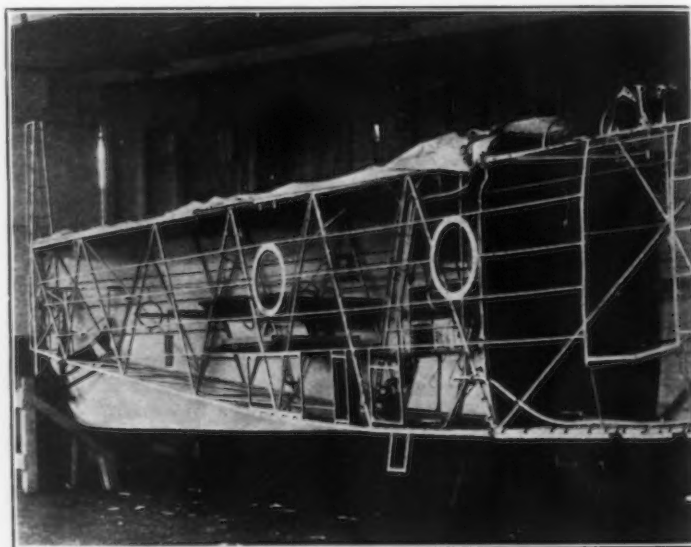


Fig. 1—Typical Assembly of Welded Trusses in

Chrome-molybdenum tubing is manufactured to any outside diameter and wall thickness which can be economically used in aircraft construction. The range of sizes is as extensive as for low-carbon tubing. The smallest size ordinarily used is $\frac{1}{4}$ in. in outside diameter by 0.028 in. in wall thickness. As the diameter increases, the ratio of diameter to wall thickness increases, and tubes over 2 in. in diameter with a wall thickness of 0.035 in. are commonly employed. The following analysis is called for in United States Army specifications and is used almost exclusively:

| | Per Cent | | Per Cent |
|-----------------|-----------|------------------|-----------|
| Carbon | 0.25-0.35 | Chromium | 0.80-1.10 |
| Manganese | 0.40-0.60 | Molybdenum | 0.15-0.25 |

This material has excellent weldability and has air-hardening properties in thin sections which are very desirable, since the tensile strength of a section close to the weld is not seriously affected.

Several tests have been reported by different investigators indicating that a tensile strength of 95,000

*Chief of material branch War Department Air Corps, Dayton, Ohio.

in Airplane Construction

lb. per sq. in. can be obtained in this material after cooling from the welding heat. The following results obtained on plain butt welds were given in a recent paper prepared for the American Welding Society*:

Chemical Composition:

| | Per Cent | | Per Cent |
|-----------------|-----------|---------------|-----------|
| Carbon | 0.28-0.35 | Chromium | 0.90-1.00 |
| Manganese | 0.30-0.60 | Molybdenum .. | 0.15-0.25 |

Physical Properties:

| | Unwelded | Welded |
|--------------------------------------|----------|--------|
| Tensile strength, lb. per sq. in.... | 98,000 | 96,000 |
| Yield point, lb. per sq. in..... | 75,000 | 72,000 |
| Elongation in 2 in. per cent..... | 12 | 7 |

The above results of the tensile test are the average of several obtained on specimens in the range of chemical composition indicated and varying in size from $\frac{3}{4}$ to $1\frac{1}{4}$ in. in outside diameter and 0.025 to 0.093 in. in wall thickness.

A unit stress of 80,000 lb. per sq. in. for the section close to the weld is commonly used in design in order to take care of any imperfections in the weld.

The chrome-molybdenum analysis gives excellent response to heat treatment. The normalized steel, which is material air-cooled from about 1625 deg. Fahr., has an ultimate tensile strength and elongation equivalent to that obtained by quenching in oil and tempering at 1200 deg. Fahr., but has a lower yield point. This air-hardening is a valuable asset in aircraft construction. The welded structures used for

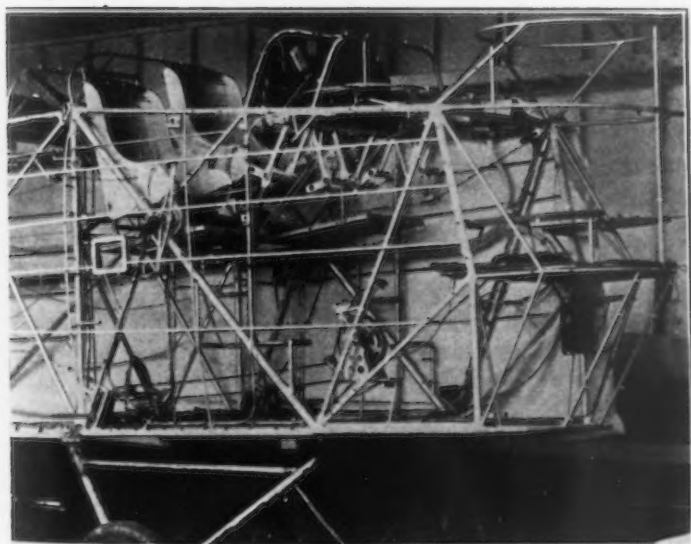
blies and the slenderness of the individual parts, which cause warping and twisting. By using a normalized or quenched and drawn steel with a tensile strength of 95,000 lb. per sq. in., it is possible to weld up these assemblies and retain this strength, due to the air-hardening properties of the chrome-molybdenum analysis.

This steel, in common with other structural alloy steels, will give a wide variation in tensile properties, dependent upon the tempering temperature after quenching. Aircraft parts that are quenched must be handled carefully to prevent damage, on account of the thin sections and the fairly sharp changes of section due to welded seams. Oil quenching is generally preferred to water quenching. Fig. 3 is a curve which has been extensively used by aircraft manufacturers as the basis of heat treatment of chrome-molybdenum steel.

One of the most important applications for tubing is in the fuselage structure. An excellent example of this type of construction is shown by the fuselage structure (Fig. 1), which represents a typical assembly of welded trusses. All of the tubes in this assembly are chrome-molybdenum steel, heat treated at the mill by normalizing or quenching to develop a minimum tensile strength of 95,000 lb. per sq. in., a yield point of 60,000 lb. per sq. in., and an elongation of 12 per cent. Fuselages of chrome-molybdenum tubing are built for the small airplane weighing 1500 lb. and the larger ones weighing 18,000 lb.

A type of joint commonly used is shown in Fig. 2. This is an excellent tension or compression joint, and a minimum strength of 95,000 lb. per sq. in. on the projected area of the tube is practically always attained by welders of only average ability. Welding can be performed by means of the oxy-acetylene flame or electric arc. Welding wire of low or medium-carbon steel gives excellent results.

Closely allied with the use of thin tubes for structural members is the use of sheet steel fittings fastening together various main and sub-assemblies. During the course of fabrication, sheet steel fittings are subjected to severe bending operations and are practically always welded or brazed. Material that will fabricate the best when subjected to these operations is the logical material for sheet metal fittings. The different types of alloy steels have been thoroughly tested to determine which give the best results. H. C. Knerr, in THE IRON AGE of Sept. 8, 1921, gave the results of a number of tests on 3.5 per cent nickel, nickel-chromium and chrome-vanadium sheet steel, and concluded that the chrome-vanadium was the best type. This was also the conclusion of other investigators, and chrome-



the Fuselage Structure of the Modern Airplane

the body and control surfaces are impractical to heat treat by quenching on account of the size of the assembly.

* "Welding the Aircraft Structure," presented at fall meeting of the A. W. S. at Detroit, Sept. 20, 1927.

A Racing Plane with Chrome-Molybdenum Steel Fuselage Is Reproduced in Upper Left-Hand Corner of Opposite Page. The plane at the right is a transport airplane with fuselage and landing gear of the same steel



vanadium has been used quite extensively during the past few years.

Recent investigations of chrome-molybdenum sheet steel have indicated that this is even superior to the chrome-vanadium. It is more easily welded, and bending operations can be performed with greater ease. It is more plastic and does not tend to spring back when released from the jig. Normalized material can be bent 180 deg. over a radius equal to the thickness of the sheet without cracking. Annealing the material or quenching and tempering at 1200 to 1300 deg. Fahr. increases the workability and permits 180-deg. bends over a radius equal to one-half the thickness up to $\frac{3}{8}$ in. in thickness. It has the added advantage that sheets and tubes, welded or brazed together, can be heat treated as a unit and corresponding physical properties will be developed in all parts of the assembly.

Such an assembly is shown in Fig. 4. This is a fit-

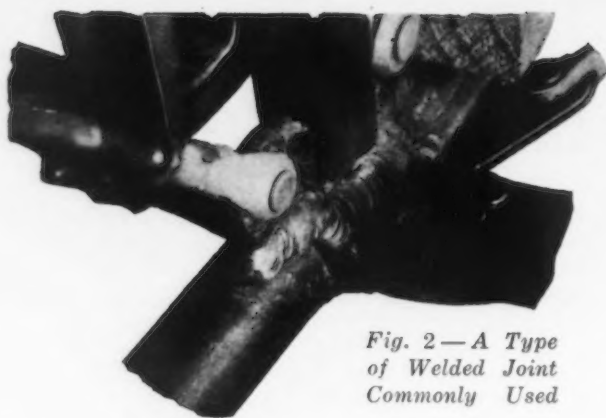


Fig. 2—A Type of Welded Joint Commonly Used

are practically identical for the same heat treatment except for the elongation. Since the elongation is a function of the test specimen, the thinner sheets will

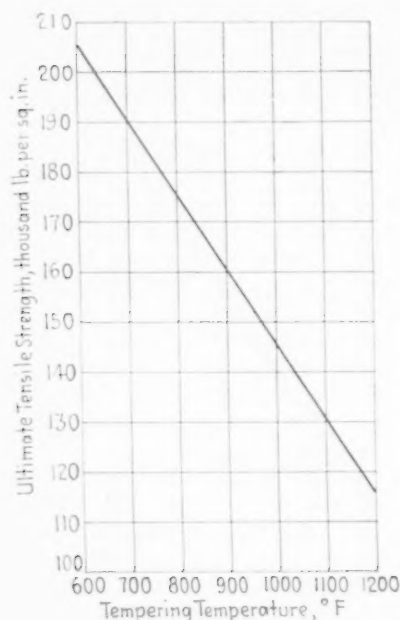
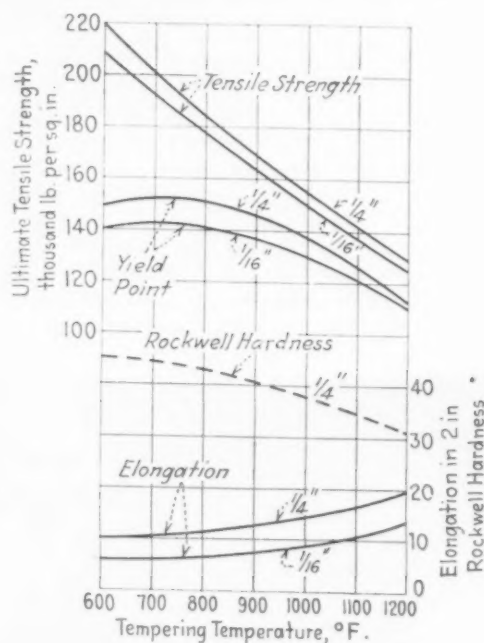


Fig. 3 (Left).—Curve Extensively Used by Aircraft Manufacturers as the Basis of Heat Treatment of Chrome-Molybdenum Steel Sheet and Tubing. Heat treatment: Heat to 1600 to 1625 deg. Fahr., quench in oil and reheat as indicated. The normalized steel has a tensile strength of about 95,000 lb. per sq. in. Chemical analysis: Carbon, 0.25 to 0.35; manganese, 0.40 to 0.60; chromium, 0.80 to 1.10; molybdenum, 0.15 to 0.25

Fig. 5.—Elongation Values for Thin Sheets Compared with Heavier Ones at the Same Tempering Temperature as Well as Other Properties of Chrome-Molybdenum Sheet Steel



ting built up of chrome-molybdenum tubing and chrome-molybdenum sheets of identical analysis, heat treated after welding by quenching from 1625 deg. Fahr. in oil and tempering at 1000 deg. Fahr. to develop a minimum tensile strength of 125,000 lb. per sq. in. The tensile properties of the sheets and tubes

not give so high a value as the heavier sheets for the same tempering temperature. This is indicated by the curve shown in Fig. 5. When the tests are made on a tube using the full cross-section for the test specimen, the results are higher than with the standard sheet metal test specimen. The sheet metal specimen used in obtaining the results shown in the curves is similar to the new specimen of the American Society for Testing Materials, with a gage length of 4 in. and a width of $\frac{1}{2}$ in.

The names of the subsidiary companies comprising the Continental Steel Corporation, Kokomo, Ind., will be dropped after July 1. These include the Kokomo Steel & Wire Co., Kokomo, the Chapman-Price Co., Indianapolis, and the Superior Sheet Steel Co., Canton, Ohio.



Fig. 4—Representative Assembly of Welded Sheet and Tube Joints



Fig. 6—Fish-Mouth Type Weld Used Extensively for Tension and Compression Joints in Chrome-Molybdenum Tubing

Conception of Safety Work Broadens

Questions of General Health of Employee Becoming Dominant —Mechanical Safeguards Only a Stop-Gap

BY C. B. AUDEL*

WHEN accident prevention first began to receive systematic attention by industry, about 20 years ago, it was assumed naturally that it was almost wholly a problem of guarding tools and equipment. It was recognized that this would in some instances be a difficult thing to do. But it was further felt that, if this guarding could be successfully accomplished, the problem would be solved for all time.

After the lapse of a number of years, during which the guarding of tools and equipment had gone forward to a considerable extent, it was found that accidents continued. It began to be apparent that accidents happened on occasion at places other than the point of operation, where most accidents had, in the absence of statistics, been assumed to have happened. Many accidents occurred quite remote from the vicinity of tools or equipment.

And so today the guarding of tools and equipment, though important, may be set down as only one of a number of major safety precautions. The problem of accident prevention, instead of being comparatively simple, as at first believed, is commencing to be recognized as most complex. Some of the other major items involved in the work of accident prevention are:

- Minimum labor turnover
- Good health, involving physical examination, both on employment and at subsequent periods
- Contentment: absence of dissatisfaction and worry
- Cleanliness, plant and personal, and neatness
- Good lighting
- English language
- Carefulness

A safety program can hardly be mapped out with any degree of completeness without taking all of these, and even some others, into consideration. But their relative importance may shift in different industries, or may shift in practically all industries alike, depending on varying factors.

Some years ago the speaker placed "minimum labor turnover" as the greatest safety device that could be installed in any plant. But, with the growing tendency to interpret compensation laws more and more liberally and to make them more nearly all inclusive, as well as to increase the compensation paid, the item of health assumes larger and larger proportions. In time, if the tendency is continued, health will become the greatest phase of the accident prevention problem.

Good Health a Prime Requisite

From 50 to almost 80 per cent of children in school have physical defects. They are either excessively above or below weight, or have defective teeth or eyesight, or adenoids or seriously enlarged tonsils, etc. Nearly all of these defects lend themselves to correction if taken in time.

No one of intelligence would think of continuing a machine in operation for long after it was found to need repairs, and such repairs would be promptly made. But our most valuable machines of all, our young folks, we either do not inspect or else inspect in a haphazard manner. And we largely fail to make repairs, but are inclined to hope they may with time outgrow the need of repairs.

*Manager employees' service department Westinghouse Electric & Mfg. Co., East Pittsburgh. This is an abstract of an address before the recent Pennsylvania State Safety Congress, held in Philadelphia.

Physicians employed by the industries were originally used largely to administer "first-aid" to employees who became sick, as well as to take care of any who might meet with accident. This work was undertaken principally for humanitarian reasons. Naturally, however, it in turn led to occasional physical examination of employees. In due course, it came to be recognized that there were economic advantages in physical examination and that it could profitably be extended to applicants for employment, and be made to apply to all employees at periodic intervals.

Physical Examination Beneficial

Regardless of the causes which brought about physical examination, it is here to stay and to be developed and extended beyond the industries. Its effect will be greatly beneficial, and more and more far-reaching, with the passing of the years.

The industries want to see every worker who applies for a job obtain the one best suited to him. Where physical examination shows an individual lacking in certain respects, industry will, in the main, still endeavor to place him. Our company will hire a worker with defective eyesight, or continue one in our employ, if he will procure corrective glasses. In a case of defective teeth or of a hernia we may engage him if he will, within a specified time, have the defect corrected.

Investigation by us many years ago, as to the causes of accident, developed the supposed fact that about 25 per cent were due to carelessness. In seeking a remedy for this we found that carelessness was in many cases produced by something else—that it might be itself an effect and not a cause. Possible causes of carelessness include largely worry and ill health.

Good Vision a Corollary of Proper Lighting

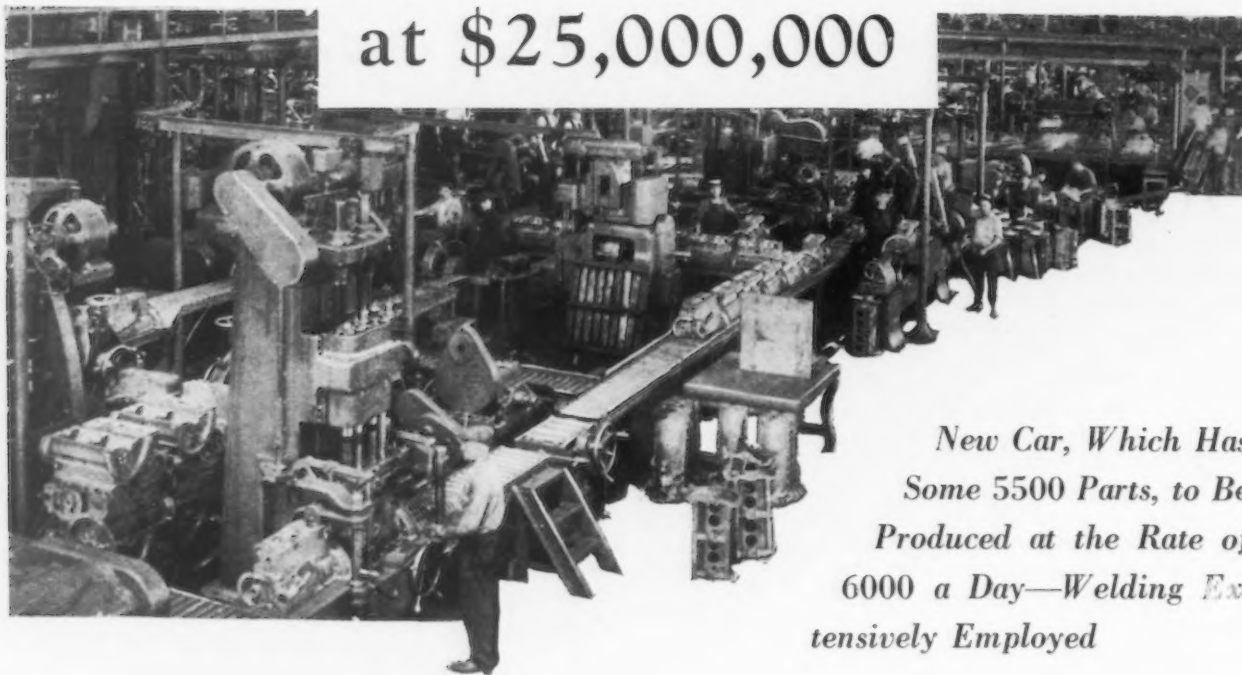
Many accidents have been traced to poor eyesight, a corollary of ill health. Admitting this, it is but a step further to say that many accidents have been due to poor lighting, in producing the equivalent of poor vision. Some years ago the Travelers' Insurance Co. prepared a chart of 95,000 accidents. This showed an increase in the short, dark days of winter and a decrease in the long, light days of summer. This has been confirmed by other investigators.

Illuminating engineers have in the past been much to blame for not impressing upon factory managers the value of good lighting and its comparative cheapness. Reference to early tables of lighting intensities for various kinds of work will generally show that, while they recommended anywhere from 10 to 20 foot-candles for drafting rooms, yet from 5 to 10 foot-candles were deemed liberal for manufacturing.

They seemed to overlook entirely the fact that many times the worker and the inspector had to make measurements as close as 0.001 in., reading the fine lines of verniers and micrometers. And they must obtain the figures from soiled, crumpled and more or less illegible blue prints.

We have found cases of defective eyesight—one in particular, with 40 per cent vision in one eye and 50 per cent in the other—yet the employee did not even know there was anything the matter. Much of this can be traced to the diseases of childhood.

Ford Shop Changes Estimated at \$25,000,000



*New Car, Which Has
Some 5500 Parts, to Be
Produced at the Rate of
6000 a Day—Welding Ex-
tensively Employed*

BY FAY LEONE FAUROT*

TO those production men interested in the fabrication of metals, especially steel, the new Model A Ford furnishes a striking example of what can be done by electric welding, forging, upsetting, mass machining, extruding and grinding.

The car, which contains some 5500 parts; several hundred more than its predecessor, is now being made at the rate of 2000 a day and it is expected that this production will be increased to 4000 per day by June 1 and reach 5000 a day by July 1 of this year. A 6000 car per day rate is planned. When it is calculated that this production will demand the daily delivery to the process line of some 33,000,000 components it will be seen that the plants at Highland Park and Fordson, as well as several of the smaller Ford factories and branches outside of Detroit, will be a busy place this year.

It is estimated by Ford engineers that in the 19 previous years devoted to the manufacture of the Model T car (1908-1927) some \$4,868,000,000 had been expended for materials and a total of \$1,970,414,972 had been paid out in wages and salaries. During this period Ford production was the greatest in the industry. In 1921, at the height of his quantity manufacture of the Model T, the Ford company was making 56 per cent of all the cars produced in this country. Incidentally, one-eighth of the factory equipment is still engaged in making Model T parts so that the 10,000,000 cars which Ford statisticians estimate are still in use may be serviced. During the change-over period last year orders amounting to \$10,000,000 per month were filled.

The fifteenth million Model T came off the assembly line on May 26, 1927, and production of the Model A began in the fall of the same year. The first Model A engine was completed on Oct. 20, 1927, and the car first publicly shown on Dec. 2, 1927. Production progressed slowly, however, due to the complete shop over-haul necessary and the fact that the quality of the new

car demanded a slower pace at first in order that the inspection requirements might be carefully learned. Not only the parts but many of the machines and processes were entirely new and no one knew just what could be expected of the various production groups.

Then there were the usual "kinks" to be ironed out; not all the welders worked satisfactorily and many small alterations had to be made in machines and the sequence of operations. The six tool rooms at Fordson have been kept busy with new machine work, alterations of standard machines, conversions of others; in a word, the Ford shop over-haul was a Herculean task and cost a fortune.

Half of Machine Tool Equipment Rebuilt

Early figures placed the cost of the shop changes at \$15,000,000 but it is safe now to estimate that the final cost will exceed \$25,000,000. Fifty per cent of the machine tools had to be rebuilt. Gear-generating machines to the number of 166 were completely rebuilt at a cost of \$3,000 each. This was made necessary by the production of the two gears in the Ford Model A rear axle. Some \$4,000,000 more was spent for new machine tools; about \$4,500,000 more went into the remodeling and altering of the tools on hand; 4500 new machine tools costing in the neighborhood of \$4,000,000 were added for special Model A work; and new dies and fixtures, including a set for forming the new steel bodies, cost \$5,000,000 more. For spinning the rear axle housing \$120,000 went for spinning machines. Another \$1,000,000 went for punch presses and other mechanical equipment of this nature. For making the new steel wheels which are assembled at Hamilton, Ohio, plant, machine alterations and new materials for this process cost another \$600,000. Three hundred welding machines, many of them entirely rebuilt in Ford shops for the special Ford welding operations, were provided at costs ranging from \$700 to \$9,000 each. Milling machines of continuous drum type were purchased. For example, three of these units, Ingersolls, are used for machining the cylinder heads, each

*Mechanical engineer, New York, and co-author of "Ford Methods and the Ford Shops," published in 1915.

machine takes 16 blocks at a time, eight on each side. The production is 250 cylinder blocks every eight hours.

Less Than 1000 Machine Tools Scrapped in 20 Years

The machine tool register shows that there are some 53,000 machine tools in service in the Ford industries today. Less than 1000 actually have been scrapped during the last 20 years which speaks well for Ford adaptability. Nothing is thrown away if it can be utilized and even when it is discarded it is not wasted. Even scrap is melted and used again. Paper is remade, tool handles made into smaller sizes. Even water, oil, gas, oily waste, in fact almost everything, is made to yield its utmost in usefulness and profit. And the shops are kept spotlessly clean.

There are at present about 100,000 men employed in the Ford shops in and around Detroit; of these 8000 are skilled tool makers. This payroll may be increased to 125,000 when production has reached 6000 cars per day.

While Fordson, as the River Rouge plant is now called, is the center of greatest production activity, there is still going on at Highland Park a variety of processes and the manufacture of the steering gear, radiators, valves, ball and roller bearings, ignition equipment, rubber parts, wire, leather, some drop forgings, some of the glass manufacture, Fordensite, lead, storage batteries, textiles and some standard small parts. The lamps are coming from the Flat Rock plant. The main process lines and final assembly line are at Fordson, where is also the new Ford administration building, recently opened.

Unusual Number of Parts Electrically Welded

An examination of the main components of the new Ford car reveals extensive use of electric welding. In fact it may be said that this new Ford is a triumph for welding, forging and stamping processes; an almost all-steel car with an unusual number of all-steel integral parts, so built up. Thus, the rear axle hous-

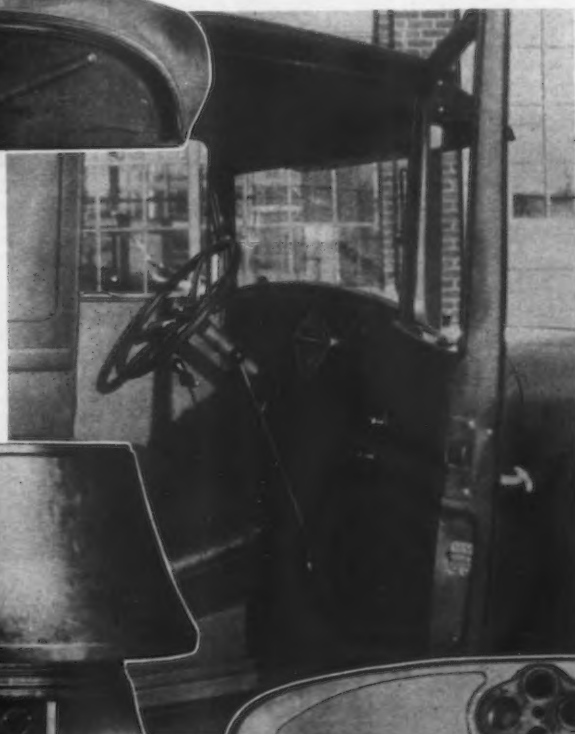
ing, the fuel tank, the fan, the muffler, the steel-spoked wheels, the steering gear housing, the differential ring gear, the starter shaft, the crankcase or engine pan, the oil pump gear, spare tire carrier, battery support, generator pulley, brake shafts, windshield frame and other small parts owe much of their strength, light weight, uniformity and speed of fabrication to the Ford system of electric welding. The actual machines used and the manner in which these parts are made will be described in a later article of this series.

It has always been characteristic of Ford practice to make everything as fool-proof as possible. The car because of its world-wide use must be simple in construction and capable of being of service everywhere; so it has been carefully designed with that fact in mind. If it is possible to make several parts into one unit, Ford engineers have tried to do it. For example, the rear axle gear is butt-welded on to the shaft; it cannot come off. There are no keys or splines to become loose and drop out. So Ford parts have been assembled wherever possible "for good and all." This makes for reliability and permanence. Incidentally it will cut the service charges materially. Furthermore, Ford parts made in this way are lower priced. Punch presses, upsetting machines, bulldozers, electric furnaces—both for forging and heat treatment—the very wide use of welders, hot-metal spinning machines, two, three and four-way drilling machines, drum type continuous milling machines, special testing machines, scales, automatic inspection devices of all kinds, conveyors, slides, roller platforms and tables, moving chains, hoists, cranes of 5, 10 and 25-ton capacity, some 92 miles of interior plant railroad, scores of special Ford machines; these facilities make Ford production unique and allow it to proceed at a rate not dreamed of a few years ago.

One is always amazed when visiting Ford shops for the first time to see how closely all the machines are grouped and how little room seemingly is left for aisles and for the men to work in. After watching the



THE Two Main Sections of the Ford Model A Fuel Tank Before Assembly Are Shown Below. The assembled fuel tank, front view, is above, and the same tank, rear view, at lower right



THE Fuel Tank, of Terne Plate, Forms the Cowl of the Car. It is made in two sections on large presses and, after passing through various minor assembling operations, the parts are joined by seam welding

operations, however, it soon becomes evident that such close grouping makes for efficiency and speed of production. Where such conveyor systems are used the work is never left on the floor beside the machine but is at once thrown or hooked on to the conveyor. New parts come to the workman in the same way and a slight holdup at any point along the line soon makes itself manifest. So the production planning is simplified by adjusting the conveyor speeds so that just enough time is given to do a good job, no more and no less. In arranging the machinery for manufacture of the new car the usual Ford practice has been followed. Furnaces stand next to hammers, annealing ovens are directly in the process line. Everything needed to perform a series of operations is there. There is no trucking of material from stock room to machine and back, no storage of material until needed, no traversing the shop for tools and fixtures. Each machine is scheduled to do a certain thing at a given rate of production and each man is skilled and able to do his special job with his machine, tools, fixtures or jig without being compelled to move from his place for anything. Ford planning is complete and accurately dispatched to prevent shortages or overstocks at any point. The process lines in turn must be able to feed the main assembly at a specified rate of speed. Here again accurately-laid out operation and assembly sheets dictate a procession of parts which is quite unvarying.

Of course this smooth-running mechanical system has not been evolved over night. It is the result of years of Ford planning. Ford process lines are usually started in an experimental way and gradually speeded up as the men become accustomed to the work. Many of the best suggestions come from the men on the job. They see ways that operations may be eliminated or

combined. The way is tried and if it is successful the process is changed. Thus the work goes on. So the process line and many of the smaller methods of assembly of the new car are not yet in "finished form"; in fact, it is never too late to change processes in the Ford industries if a new way is better or faster. All things are in a state of flux and every man in the Ford factory knows that what is best today may be discarded tomorrow when a better method or material is discovered. The tools, too, are forever being changed. So are the processes. The method of producing the piston pin by extrusion is a case in point. It is producing a better pin, the steel is gaining strength by the process. Ford tool designers attempt anything that will promise better quality or faster production.

Welding Equipment Redesigned

The complete redesigning and rebuilding of the electric welders used for welding the fuel tank saved the day for the production department when serious trouble in getting production in this department threatened. The tank, made of terne plate, forms the cowl of the car and is made of two main sections seam-welded to form an air-tight tank. The parts are formed on giant presses and after passing through various minor assembly operations are finally brought to the welders for junction.

When the actual work was started, however, the inspectors discovered that the welders were not doing a satisfactory job. The joints were not tight and the welders were skipping. Terne plate is, of course, difficult metal to weld; it is apt to burn in spots and in others not heat up evenly, one resulting in faulty metal and the other in no weld. Things looked serious for a time, until the Ford production engineers began to do some investigation work on their own account. They



DIFFICULTIES in Welding the Terne Plate Fuel Tank Were Overcome by Redesigning the Welding Equipment. Production from 10 of the new machines is at the rate of 2500 tanks a day. This is one of a large number of examples of equipment changes

Welding of the Fan Is Done on the Equipment Shown at the Left



End of the Final Assembly Line at Fordson. Conveyor speeds are adjusted so that just enough time is given for the particular operation

found that the standard welder bought for the work could not be made to do the job. So they decided to redesign and rebuild it. This they did. Now ten of these new Ford special welders are turning out 2500 fuel tanks per day.

This is what had to be done to make these welding machines work satisfactorily on the fuel tank job: The transformer was enlarged, the copper welding disk arms were shortened, Ford type electrodes, which are said to give superior current efficiency, were installed, the bearing in which the welding spindle was mounted was altered and mercury introduced, the shaft nickel-plated and baked, and a Ford type of interruptor cutting the current 360 times per minute as a minimum, thus preventing the burning of the stock under ordi-

nary circumstances, was put in place of what was claimed to be a less efficient standard unit used for that purpose. This is just one example of hundreds of changes and alterations which have been made in machines, special and standard, so that they may function satisfactorily in the Ford shops.

The development of electric furnaces and their adaptation to Ford purposes is another story in itself.

Machine tools, special heads, unusual, made for just one purpose, special tools, jigs, fixtures, dies; there are hundreds of unique things to be found in the Ford shops. Each is assisting in advancing Ford production and incidentally contributing not a little to the universal advancement of the art of metal working—and the welfare of mankind.

Hacksaw Simplified Practice Recommendation Adopted

WASHINGTON, April 17.—Representing a reduction of approximately 75 per cent in variety a simplified practice recommendation for standard tungsten and carbon hacksaw blades was adopted at a general conference at the Department of Commerce under the auspices of the Division of Simplified Practice. The conference, held April 12, set July 1 as the date at which the recommendation shall become effective for new production and Jan. 1, 1929, as the date for clearing current stocks.

The recommendation follows:

Hand Hacksaw Blades, All Hard; Also Flexible Hacksaw Blades

| Length (Inches) | Width (Inches) | Thickness (Inches) | Number of Teeth per Inch |
|--|-------------------|-----------------------|-----------------------------|
| 8 | $\frac{1}{8}$ | 0.025 | 18, 24, 32 |
| 10 | $\frac{1}{8}$ | 0.025 | 14, 18, 24, 32 |
| 12 | $\frac{1}{8}$ | 0.025 | 14, 18, 24, 32 |
| 12 | $\frac{1}{8}$ | 0.025 | 14, 18, 24 |
| <i>Power Hack Saw Blades, All Hard</i> | | | |
| 12 | $\frac{5}{16}$ | 0.032 | 14, 18 |
| 12 | $\frac{3}{4}$ | 0.032 | 14, 18 |
| 12 | $\frac{3}{4}$ | 0.049 | 10, 14 |
| 12 | 1 | 0.049 | 10, 14 |
| 14 | $\frac{3}{4}$ | 0.049 | 10, 14 |
| 14 | 1 | 0.049 | 10, 14 |
| 14 | 1 | 0.065 | 8, 10 |
| 17 | 1 | 0.049 | 10, 14 |
| 17 | 1 | 0.065 | 8, 10 |
| 18 | $1\frac{1}{4}$ | 0.065 | 8, 10 |
| 20 | $1\frac{1}{4}$ | 0.065 | 8, 10 |
| 24 | $1\frac{1}{2}$ | 0.065 | 6, 10 |

The conference appointed the following standard committee: W. P. Jeffery, managing director Hack Saw Manufacturers Association, to represent the manufacturers; L. C. Puchta, National Supply and Ma-

chinery Distributors' Association, to represent the distributors; and F. S. Walters, American Society of Mechanical Engineers and the Westinghouse Electric & Mfg. Co., F. C. Nichols, Navy Department, and a representative to be appointed by the American Railway Association, to represent the organized users. The committee will make periodic re-surveys to determine the degree of adherence and to recommend revisions if conditions warrant.

Trumbull Steel Co. Broke Production Record in March

In March the Trumbull Steel Co. established new production and shipping records at its plant at Warren, Ohio. Last month the company shipped 55,720 tons of finished material and in a single day moved 4000 tons, requiring 126 railroad freight cars. Production was at the annual rate of 668,000 tons of finished materials. Previous to 1926, the company's high monthly shipment record was 41,000 tons. Production records were set up in March by the open-hearth department, blooming mill, hot strip mills, tin mills and cold rolled department. In March, 1928, Trumbull produced 21,941 tons more steel than in March, 1925, with an increase of only 100 in its working force in the steel plant. Steel tonnage per capita throughout the entire plant last month exceeded output per man in March, 1925, by 56½ per cent.

Trumbull is installing new wide cold strip mills of the latest design, which will be in operation in two months and will enable the company to produce highly finished wide strip steel for use in automobile bodies.

Bethlehem's New Pipe Mills

Sparrows Point Plant Turns Out Wide Range of Butt
and Lap-Weld Product—Materials Move
Minimum Distances

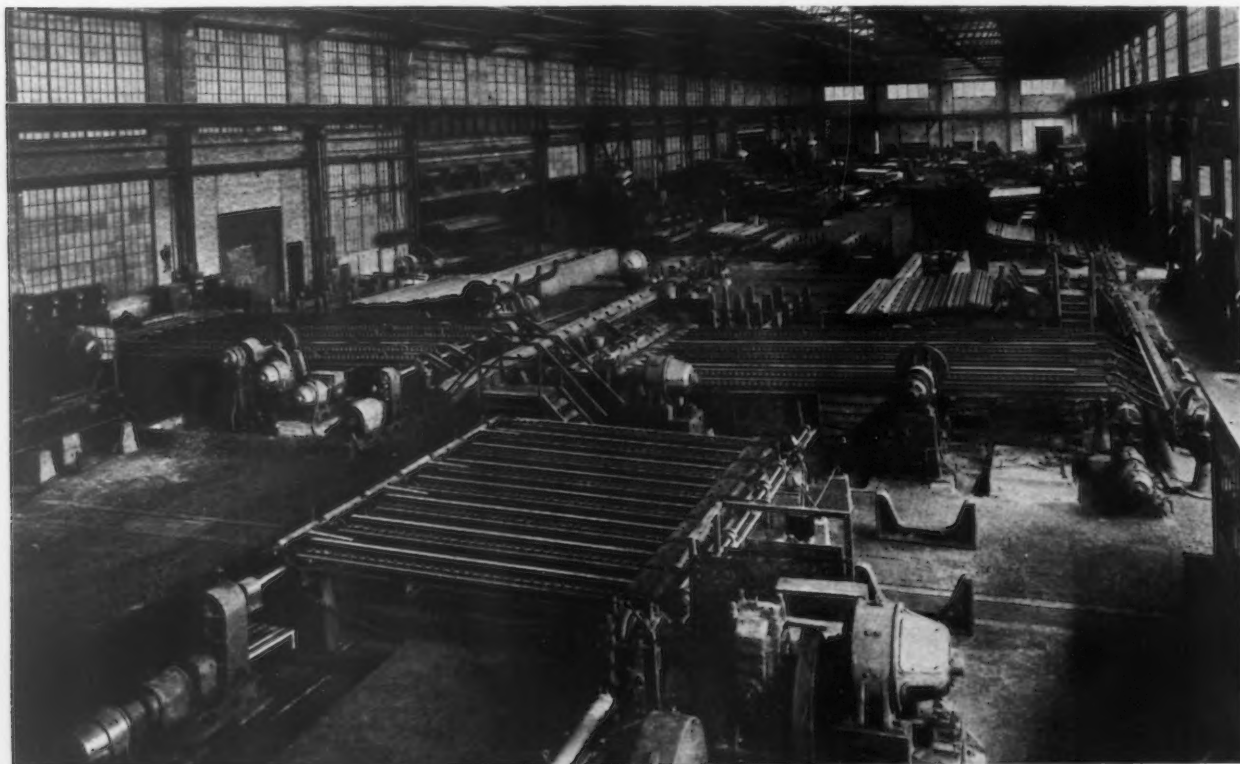
BY GEORGE A. RICHARDSON*

IN expanding the Maryland plant of Bethlehem Steel Co. to cover the widest possible range of products, the latest construction is the modern plant to manufacture butt and lap-welded pipe. Ground was broken for the new units over a year ago and the first of the butt mills came into operation last fall. At present two butt mills and two lap mills, with all auxiliary equipment, are in full operation. All sizes of pipe from $\frac{1}{8}$ in. up to 16 in. in outside diameter, inclusive, can be made.

Sparrows Point is advantageously located on tide-water, with docking facilities for the largest ocean-going vessels. Raw materials can be economically

Adjacent to the skelp mill building are other continuous mills for rolling billets, sheet bar, wide skelp, etc. All of these are supplied from the blooming mill sections, which adjoin the entrance ends of the continuous mills. The new blooming and continuous mills are housed in a brick and steel-frame building about 1225 ft. long, which, together with the skelp mill building, makes a total length of 1825 ft. In the blooming mill section are the soaking pits, gas producers, 200-ton ingot strippers, etc., which are located at one end and form an integral part of the main units.

After soaking, the ingots are rolled in the blooming mills and thence through two sets of continuous



GENERAL View of No. 1 and No. 2 Butt Mills, Looking East Toward Warehouse. In immediate foreground are sizing rolls and the short cooling rack. The finishing department is beyond the two "shields"

brought in and finished product shipped to all parts of the world. In addition to water shipping facilities, three railroads are available for shipments to interior points.

At Sparrows Point the same trains of mills which supply the skelp not only care for the requirements of the pipe mills, but also supply sheet bars for the tin-plate and sheet mills, blooms for the rail mill, slabs for the plate mill and billets for the wire mill. The continuous mills where skelp is rolled are in separate units, housed in brick and steel-frame buildings. There is a billet-receiving crane-yard, skelp-loading crane-yard and a mill building 600 ft. long. In this building are housed the reheating furnaces, rolling mill, shears and other necessary machinery and equipment required to finish this product.

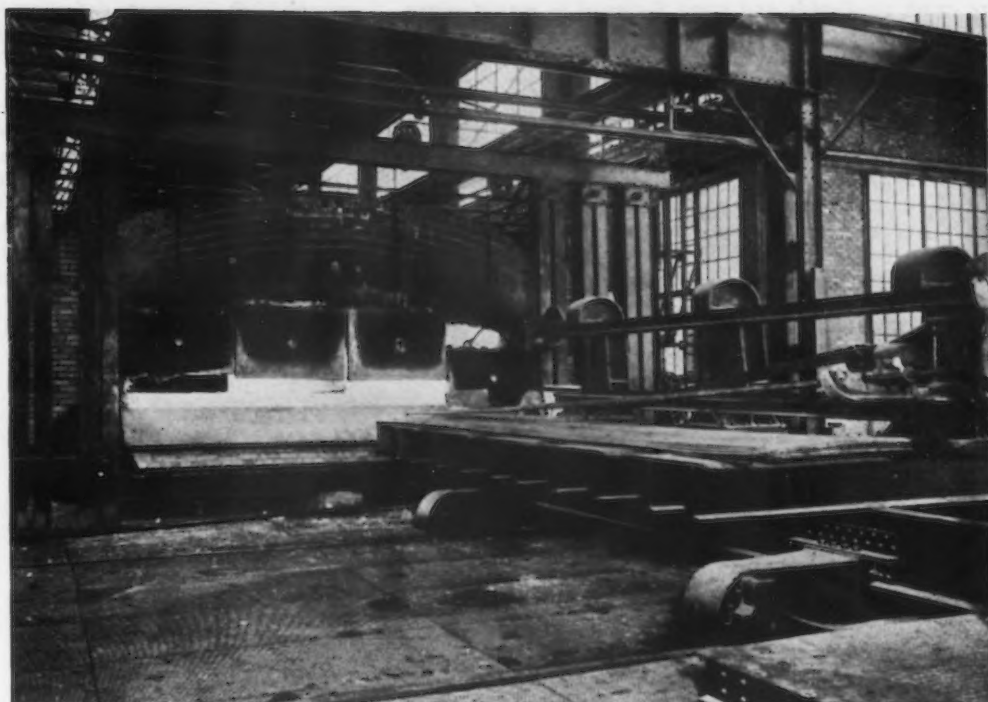
*Bethlehem Steel Co., South Bethlehem, Pa.

mills, where the blooms are rolled down into the required sizes of skelp. The finished skelp is then transferred by rail to the pipe mills, a short distance away.

Four new pipe mills are housed in a structural-steel and brick building made up of seven units or bays. Five of these units parallel each other, running the long way of the building. These house respectively No. 1 and No. 2 butt mills, pipe galvanizing shop and machine shop, coupling department and No. 1 and No. 2 lap mills. Running at right angles to these units, and extending the entire width covered by all of the above buildings, are two buildings across the ends. That at one end is for skelp storage and at the opposite end for storage and shippings of finished products. A separate gas producer building is located adjacent to the pipe mill buildings.

This pipe mill layout is in a newly developed section

FLAT Skelp
Charger in
Operation at No.
1 Lap Mill. This
furnace heats the
steel only for
scarfing and
bending. Skelp is
delivered to the
charger by crane



of the plant, reached from the main part by a bridge across Humphrey's Creek, which does triple duty as a railroad, trucking and foot bridge. The first unit in this new section was the wire mill. The new pipe mills, located close by, are supplied with compressed air, water, fuel oil and steam by a power plant designed to take care of the requirements of both plants.

Operation of the gas producer unit is practically automatic. One floorman runs the entire floor, on which the seven gas producers are located. Coal is brought to the building by rail and dumped into track hoppers. From these it is lifted to the top of a tower by automatic skip hoists and dumped into two large storage bins. Two rotary crushers are provided for crushing the coal to the proper size for the producers.

Over each producer is an individual bin. A distributing crane, on which is carried a scale hopper, serves these bins, each load being weighed by the crane-man, who is also weighmaster. In this way a fuel record is maintained showing consumption each day, week or month, or as required. The producers are hopper-fed.

Each producer will gasify about 3500 lb. of coal an hour. A standard-gage ash-car track underneath, on ground level and connected to yard tracks, makes it

possible to drop ashes and flue dust directly into the car without rehandling.

Gas leaves the producer at a temperature of 1200 to 1400 deg. Fahr., and passes to the heating furnaces through steel brick-lined overhead flues. Dust catchers, adjacent to each gas producer outlet and approximately every 50 ft. in these flues, make it possible to deliver clean producer gas to the furnaces.

Skelp is stored in a bay which extends across the entire front of the pipe mill buildings, as mentioned above. There is storage capacity of 50,000 to 60,000 tons of skelp—more than ample for the requirements of both butt and lap mills. Skelp is brought here from the skelp mills by rail. Two 10-ton cranes are used for unloading, storing and transferring skelp directly to the shears at charging end of furnaces.

From the time skelp enters the skelp storage, the flow of material is in one general direction until it leaves the mills or warehouse as pipe. By extending the chargers and clipping and bending shears into the skelp storage, it has been made possible to utilize the storage cranes for transferring material direct from storage to the racks in front of these machines.

In the north bay are No. 1 and No. 2 butt-welding mills, with their auxiliary equipment. These two mills

Magnetic Charger
of No. 2 Butt Mill
Delivering Skelp
into a Furnace 9
Ft. Wide. The
charger can tra-
verse the width
of the furnace
and takes its load
from the clip-
ping and bending
shears



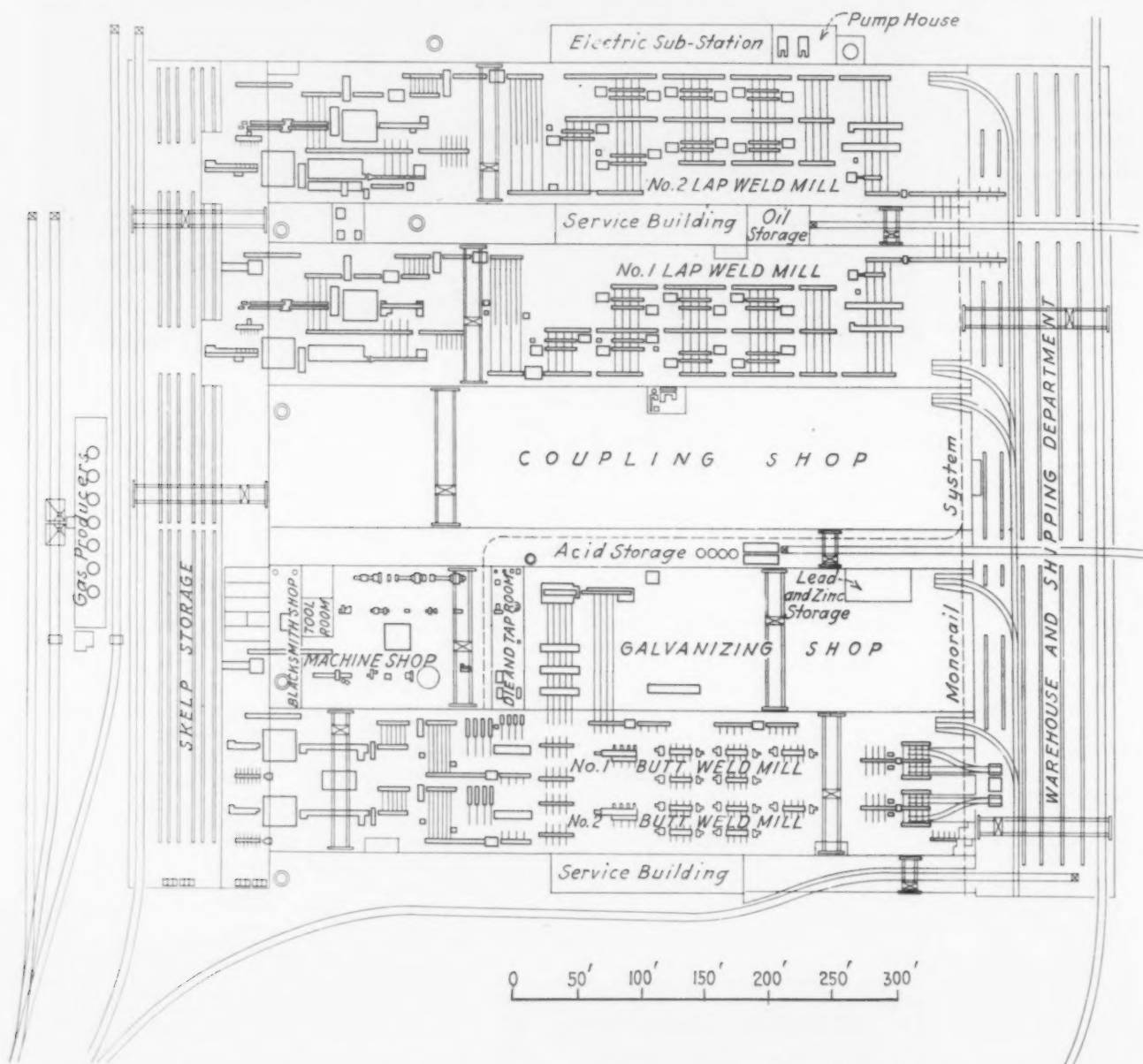
are exact duplicates and were designed to manufacture all sizes of butt-welded pipe from $\frac{1}{8}$ in. to 3 in. in diameter.

Skelp from the storage is transferred by crane to the clipping and bending shears. Here the ends are clipped and bent so that the piece will more easily enter the welding bells. From here it passes through the heating furnaces, welding, sizing, straightening, testing, threading, oiling, bundling, etc., emerging at the warehouse and shipping end as finished pipe.

Skelp heating furnaces having hearths 9 ft. wide are used. Into these skelp is charged by magnetic chargers,

enough back to remove defective welds. These saws are staggered, one end of the pipe being cut off at a time. After sawing, a reaming and facing machine puts the ends in good condition, ready for straightening, testing and threading operations.

From the cooling rack the pipe passes through automatic straightening machines of a type believed to be the most satisfactory yet developed. These remove all kinks or bends in the pipe and straighten it to meet requirements of the trade. At the same time, the outside surface is made smooth and practically all of the remaining scale is removed. The pipe, as turned out,



Steel Moves from Skelp Storage, at Left, in a Straight Line Across the Plant to the Warehouse and Shipping Platforms at Right

which travel not only over the entire width of the furnaces, but can be moved up to the clipping and bending shears for direct loading.

After being brought to welding temperature, the skelp is pulled out of the furnace, one piece at a time, and drawn through bells which are set by hand in a bell block or holder which is fixed on the end of the drawbench nearest the furnace. The tongs, caught by attachments located at intervals on the drawbench chain, pull the skelp through a bell of suitable size. The skelp is bent and welded in one operation, forming a pipe which is slightly oversize.

When the tongs are removed the pipe passes to the size-roll trough and through guides to the first sizing rolls; thence out on to a short cooling rack. The second sizing rolls reduce the pipe to the outside diameter required by standard specifications. From these the pipe passes on to a final cooling rack, on which it moves between two high-speed saws which cut off the end far

is as nearly straight and "scale-free" as it is possible to produce.

Thorough inspection is given to each piece at the cooling racks and after every step in the finishing department. Surface defects, split ends, imperfect welding, lack of straightness, are among the causes for rejection by the inspector.

All pipe after straightening is subjected to hydraulic test. Two testing machines are provided for each of the butt mills and can handle any of the sizes made. These machines are of the quick-acting type, and are connected with a direct accumulator line at 750 lb. pressure. Four intensifiers give an added range of test pressures above and below 750 lb. as required for larger pipe and special pipe for ammonia plants, hydraulic work, etc. All defects in welds become apparent in the hydraulic test and pipe having such defects is scrapped.

After the hydraulic test, the pipe is ready for threading. Two large-size automatic six-spindle threading

GALVANIZ-
ING Department, Showing
Drying Plate,
Galvanizing
Tank, Inclined
Drawbench and
Cooling Rack.
The inclined
bench permits ex-
cess spelter inside
the pipe to drain
back



machines handle all sizes of pipe from $\frac{1}{8}$ in. to 2 in. in diameter. Pipe from $2\frac{1}{2}$ in. to 3 in. in diameter is threaded on mill-type threading machines provided with an air grip. There are two machines to a threading bench, one at each end. The pipe is easily moved back and forth between the two machines on rollers set in the top of the threading bench, one end of the pipe being threaded at a time. From the threaders the pipe goes to the inspection table for final inspection.

Pipe that passes the final examination goes to the coupling screwing-on machine, where each length is fitted with a coupling, and thence to the oiling machines. These are of the spray type and are readily adjustable so that the thickness of the protective coating can be varied to suit the requirements. The coating is applied to all black pipe and dries quickly and hard, thus to prevent rusting either in transit or in stock.

After the protective coating has been applied the pipe goes to the measuring table, where each length is

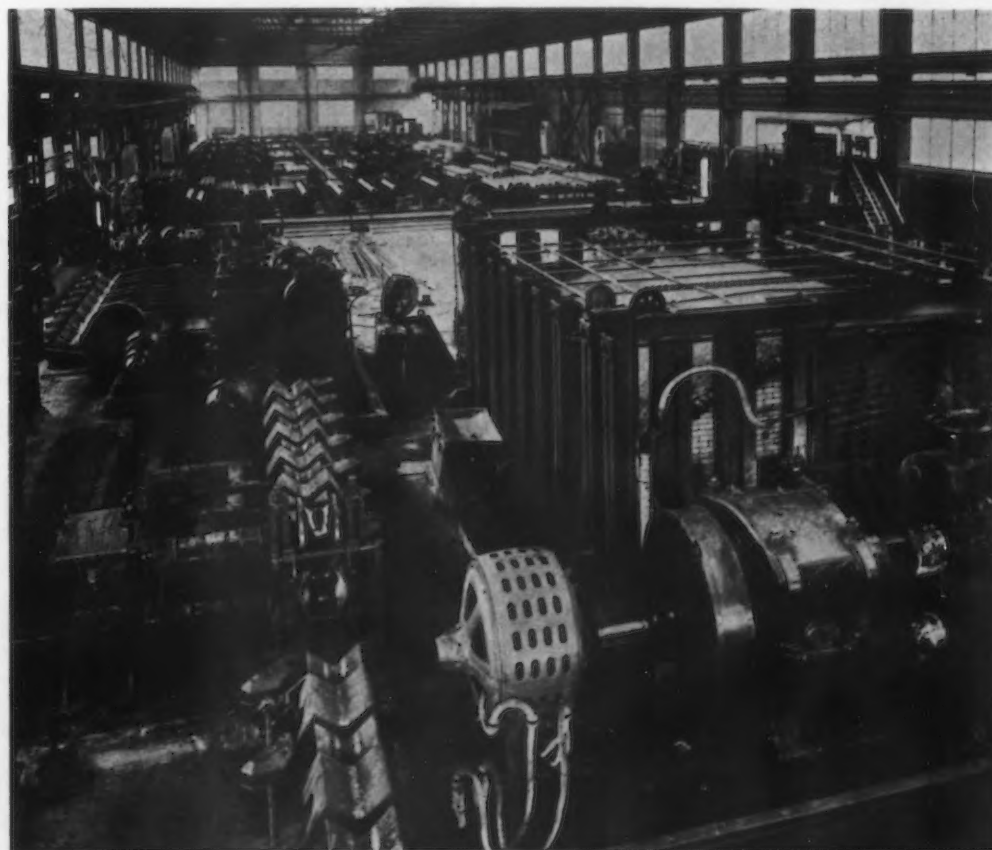
measured and where sizes from $\frac{1}{8}$ in. to $1\frac{1}{2}$ in., inclusive, are bundled. In the case of bundled pipe, the total number of feet and inches is marked on a metal tag attached to the bundle. Pipe 2 in. and larger is not bundled, the length in feet and inches being stenciled on each piece.

Pipe from the measuring and bundling benches may be loaded directly into cars or sent to the warehouse. Small electric cars operated by third-rail contact are used to transfer material from the measuring and bundling benches direct to the warehouse.

Ample warehouse facilities are provided by a warehouse which extends across the delivery end of the five pipe mill building bays. This is served by two cranes and has capacity for storing about 25,000 tons of butt and lap-welded pipe.

Proper storing of the pipe is a factor in insuring the delivery of the product in good condition to the customer. The practice here is to place planks between

NO. 2 Lap Mill,
Looking East
Toward Ware-
house, with
Welding Furnace
at Right. From
the control plat-
form, just off the
extreme left of
cut, one man con-
trols all hot-mill
operations. This
mill makes pipe
from 6 in. to 16
in. in diameter



layers of pipe. This keeps the pipe straight and eliminates the possibility of damage that is apt to occur in piling large lifts.

The galvanizing department occupies a part of the second building bay, which opens into the side of the butt-weld mill division. The equipment includes two sulphuric tubs, a rinsing tub, a muriatic acid tub, a drawing rack, waste-gas heated drying plates and a galvanizing pot, together with an inclined draw bench, cooling rack, etc.

Procedure up to and including the galvanizing operation represents standard practice. Pipe to be galvanized is deposited on a receiving rack which extends into the butt weld mill building and is served by the crane in this building. The pipe is delivered from the receiving rack into the sulphuric acid pickling tubs on top of large bronze sprocket chains hung in the various tubs. At given intervals these chains, which are operated by motor-driven sprockets, roll the pipe

all requirements of the pipe mills, and then the galvanizing shop. The aim was to locate the machine and blacksmith shops as centrally as possible.

Two building bays are given over to the lap mills. The No. 1 lap mill is capable of turning out all sizes of lap-welded pipe from 2 in. in diameter up to 8 in., inclusive. The No. 2 mill manufactures pipe from 6 in. to 16 in., inclusive. These two mills are practically the same, except for differences in size of equipment.

After being weighed, skelp from storage is handled by a crane directly on to a flat skelp loading rack. From there it is delivered on to a flat skelp-charger, which moves electrically across the face of the heating furnace. The furnace in this case is used only for heating the skelp for scarfing and bending.

Skelp is pushed out from the furnace into electrically driven scarfing rolls so mounted that they can be moved across the face of the discharge side of the furnace from one side to the other. On leaving the scarfing



WAREHOUSE.

Note method of piling pipe for stock, with boards between lifts. This building is served by two overhead cranes and has storage capacity for about 25,000 tons of pipe

around in the bath. This insures thorough pickling and cleansing.

Each piece of pipe after galvanizing is wiped by being drawn through steel wipers, which insures a smooth finish and results in a satisfactory spangle. The drawbench, of the angle type, is inclined, to permit excess molten spelter to drain back from the interior of the galvanized pipe into the galvanizing pot. As the pipe is drawn up the incline to the top of the draw bench, each piece is applied against the nozzle of a compressed air line. The air blows the interior clean and gets rid of any excess spelter. From the draw bench the pipe goes to the cooling rack, where it is allowed to cool slowly, while it is being conveyed to the delivery end.

Galvanized pipe is not being dipped in water at the Maryland plant. The elimination of the water dip is one of those small refinements which aids in giving a better spangle finish and appearance. After cooling, the pipe is inspected, both inside and outside, and then goes to the threading machines. The subsequent handling of the galvanized pipe is the same as that of black pipe, except that there is no oiling of the surface.

Only a part of the second bay is occupied by the galvanizing department. Nearest the skelp storage a blacksmith shop is located in this bay. Then comes a completely equipped machine shop for taking care of

rolls the skelp passes to the scarfing table and is pulled across by chain conveyors to the draw bench. From here, in turn, it is drawn through the bending dies and is bent into shape for welding.

Skids are used to transfer the bent skelp to the traveling bent-skelp chargers, which charge the heating zones of the welding furnaces of the two-gutter type. There are two welding positions, the skelp being moved from the heating zones to the gutters, which are located symmetrically on either side of the center line of the furnace.

Welding of the skelp is done by welding rolls driven by a 400-hp. electric motor. They can travel back and forth opposite the two welding troughs. The bars are controlled by a double bar puller.

Two sizing and two cross-roll straightening operations follow. Immediately after welding, the pipe passes through the first sizing rolls and then through cross rolls, which straighten it. From that point it passes the short cooling rack, which is operated at variable speed. This makes it possible to control the temperature of pipe entering the second sizing rolls, as at the butt mills. It then passes into the second sizing rolls and thence through the second cross rolls.

As with the butt-welded pipe, the temperature is reduced between the first and second sizing so that the second sizing operation is, to all practical intents and

purposes, done black hot, thus insuring correct size and round pipe. A cooling rack leading from the second cross rolls allows the pipe to cool down to normal temperature as it is being inspected. It is then weighed and conveyed to the cold pipe straighteners.

These are the only mills in the country where the cold straightening machines are in a direct line with the cooling racks, sizing rolls, etc. All pipe passes through the cold straighteners without any break in handling, from the time it leaves the furnace until it is delivered to the finishing department.

Pipe, after being straightened, goes to cutting-off machines. There are two pairs of these, of the mill type, using double tools. The crop ends are cut off, ends of pipe faced, reamed, chamfered and rounded up, thus insuring true and round ends for the threaders.

The threading machines, of conventional mill type, with a lead-screw to insure correct pitch, are used solely for threading. This is a decided advantage, as this practice saves wear and tear, ordinarily occasioned by using the threading machines for chamfering, etc. The machines thus are more like precision tools than is usually the case.

One unique feature of the lap weld mills is the use

of driven roller conveyors for handling the pipe from operation to operation throughout the entire mill.

Each piece of pipe is inspected for surface defects, blisters, laminations, etc. The thread size is measured and checked for taper and pitch. After this inspection the pipe goes to the coupling screwing-on machine and thence to the hydraulic tester. Each piece of lap-welded pipe is tested with the coupling on it. After this hydraulic test comes another general checking inspection before delivery to the warehouse and shipping building.

Each piece of pipe is weighed separately and must weigh within allowed standard tolerances. The weight per foot, total weight and length are stenciled on each piece.

Oiling machines similar to those used at the butt mills oil the pipe as it is traveling through on a roller conveyor.

One striking feature in the lap weld mills is the control system. Every piece of equipment in the hot mill end is controlled by one man, located on an elevated platform behind which is the big control panel. A similar arrangement is in use in the finishing department.

Moves for Conference on Warehouse Distribution

Hardware Jobbers and Mill Supply Houses Asked to Join with Manufacturers in Applying Methods of Handling Bolts and Nuts to Wide Range of Commodities

THE plan evolved by the bolt, nut and rivet industry for the economical distribution of its products has worked out so well that its sponsors, under the leadership of Charles J. Graham, president of the Bolt, Nut and Rivet Manufacturers Association, Pittsburgh, believe that it can be applied to other products that are distributed either partly or entirely through hardware jobbing and mill supply channels. Accordingly, a national conference to discuss sales and distribution plans has been proposed in a pamphlet issued from Mr. Graham's office, and, if enough sentiment favorable to it is created, Mr. Graham will call such a meeting.

The basic principle of the distribution plan successfully applied by the bolt, nut and rivet manufacturers is the elimination of the manufacturer as the leading competitor of the distributor. With the province of the merchant or jobber clearly defined and freed from incursions by the manufacturer, it has been found that a degree of market stabilization has developed that was entirely lacking when manufacturers would take orders of a size that properly belong to, and could be more economically handled by, jobbers.

Asks Industries to Appoint Representatives to Confer with Jobbers' Chairmen

Mr. Graham says in the pamphlet: "The necessity for stabilization in all of our leading lines is more apparent today than ever before, and is a problem that is being studied not only by industrial executives, but by the Government itself.

"Stabilization to a point of producing reasonable profits in all lines is the essential requirement, if we are to maintain and perpetuate present labor conditions, both from the standpoint of employment and wages paid.

"The necessity for the continuance of present labor conditions and, if possible, an improvement in them, is now a well recognized fact, and is the very foundation of our present and future prosperity.

"The plan followed by the bolt, nut and rivet industry is applicable to all competitive lines and, should it be adopted by the leading industries, would create a condition in selling and distribution never before at-

tained, and would become an automatic stabilizer of market conditions.

"It would be the largest factor in cost reduction of anything heretofore attempted, and would affect particularly the great overburden of American business, overhead expense, creating a saving in all departments from the point where actual manufacturing stops.

"In the development of this plan, the greatest organization ever put together in the distributing industry has been created, and is ready to function in all lines that are interested.

"A committee is now in existence in practically every important jobbing center in the country, consisting of a prominent jobbing executive as chairman and in its membership covering the outlying territory.

"The chairmen of these committees will all be invited to attend, and a majority of them have already signified their intention of doing so, should the meeting be called. Some jobbers not represented on the committees will also be invited, as well as the officers of all national jobbing and mill supply associations.

"To make the meeting thoroughly representative, and limit the number in attendance, it is suggested that each industry appoint five executives to represent the industry as a whole. This will be a very simple matter where industries have trade associations or other types of organization. Where such organizations do not exist it will be necessary for the appointments to be made by correspondence, or for one of the leading companies to call a meeting of its particular industry for the appointment of such a committee.

Products Covered by Distribution Plan

"By combining the suggestions of the 34 jobbers' chairmen, the following industries are being approached, to determine their attitude regarding such a meeting, and should the reaction be favorable, invitations will be extended to five executives representing each industry, appointed as heretofore suggested: Ammunition; bars, shapes and plates; builders' hardware; chain; chain hoists; cold-rolled steel, including shafting; composition roofing; conduit; copper and brass

(Concluded on page 1132)

Small Cloudburst Superhardening Machine

A method of superhardening by "cloudburst" was described by Edward G. Herbert in *THE IRON AGE* of Feb. 2, page 332. Mr. Herbert now sends a photograph of a laboratory machine designed to treat case-hardened disks up to 1 1/4 in. in diameter.



Intermittent Device for Superhardening Small Surfaces by Impact With a Cloud of Steel Balls

About 20,000 steel shot are placed in a cup-shaped hopper, which is elevated to a point near the top of a vertical shaft, so the slots there observed are immersed in the shot. The latter start passing through the slots, falling down the hollow shaft and striking the work beneath. A disk to be treated has been previously placed on top of a perforated piston, entrance being effected through the side door in a box-like stand. The piston is slid up the vertical shaft until the distance from slots to piston is correct, as indicated by a counterpoise and meter stick at the rear.

As explained in the previous article, the height is set so that the falling balls work-harden the surface without indenting it. It takes about half a minute for the balls to drain from the hopper; they are then collected in the pan at the bottom, reloaded into the cup-shaped hopper, and re-elevated. Meanwhile the disk being treated is sunk gradually, so the hardening can be progressive.

A disk tested in the machine possesses a highly reflecting surface with faint markings suggesting very fine ripples on a turbulent liquid. A soft spot will be covered with small pits, close together, like a badly corroded surface after cleaning off the rust.

Special Railroad Car for Transporting Long Beams

To avoid expensive blocking in shipping long steel beams that must be carried on two cars, the Carnegie Steel Co. has had a dozen gondola cars built measuring 65 ft. inside. This is about 25 ft. longer than standard for large cars of this type. Since stock lengths of 60 to 65 ft. are common for fabricating shops, it is estimated that the 65-ft. car will handle at least 80 per cent of the long lengths of steel now being ordered.

While the cars have been used mainly in shipping steel locally from one works to another of the Carnegie company, or to nearby fabricators, one of the cars was shipped some time ago to the Boston warehouse of the company and its behavior was carefully observed with regard to negotiation of curves and clearances.

As built, the car has a marked capacity of 140,000 lb. The tare weight averages about 67,000 lb. The car measures 68 ft. 9 in. over striking plates, 7 ft. 9 in. in width inside, 8 ft. 6 in. wide overall, while the trucks are 55 ft. 10 in. center to center. The height of sides is 3 ft. The trucks are of the standard four-wheel type, the same as would be used for a shorter car of the same capacity.

While the cars were built to negotiate curves of 200-ft. radius they have in fact been successfully operated over curves with a radius as low as 175 ft. The cost of the 65-ft. car is estimated at only slightly

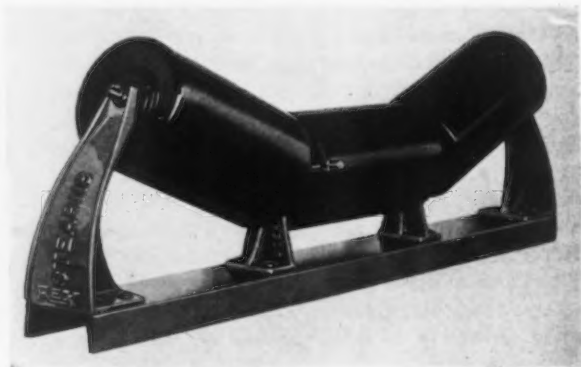
more than one-half that of two ordinary gondola cars. Maintenance and deterioration on one such long car will be considerably less than on two of the mill-type cars now used for taking double loads. The track space occupied by the long car is 30 per cent less than that of the double load. This will result in shortening trains of given tonnage and will increase yard capacity accordingly.

A principal factor in getting out the long cars was the desire to lessen the damage to goods in transport. There will be considerable elimination of dunnage, resulting in less dead weight to be hauled per ton of revenue traffic moved. Train resistance will be reduced, particularly around curves. General safety is much enhanced by the innovation.

Malleable Iron Brackets for Belt Conveyor Carrier

A new belt conveyor carrier has been put out by the Stearns Conveyor Co., Cleveland (subsidiary of Chain Belt Co., Milwaukee), for mounting pressed steel and chilled rim cast iron idler units. The supporting brackets are made of certified malleable iron. By redistribution of the metal, a much stronger bracket has been worked out than is possible in gray iron, with no considerable increase in the total amount of metal used.

The spacing between idlers is reduced to 5/16 in. on this new carrier. With this close spacing, there is little chance of the belt "creasing" and being worn accordingly. The new type of bracket has made it possible to secure this close spacing, and at the same time



Close Spacing and Ease of Replacement Feature This New Idler for Belt Conveyors

keep the idlers safely mounted and quickly and completely interchangeable. Any idler can be removed from the carrier without disturbing any of the others.

Five sizes—18, 20, 24, 30 and 36 in.—are offered, with either Rex-Stearns pressed steel or chilled rim cast iron idlers. Both have one-piece pulley shell construction, Timken bearings, long-time lubrication and a positive grease seal, which serves the double purpose of keeping dust out of the idler and grease within it. The new idler is interchangeable with previous Stearns units.

Light-Weight Combination Cutting and Welding Torch

A new combination cutting and welding torch which weighs only 40 oz., and which may be used either for welding or cutting operations merely by interchanging the tips, has been added to the line of the Alexander Milburn Co., Baltimore.

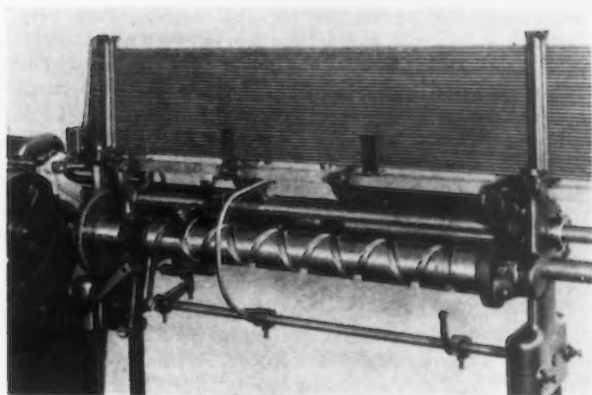
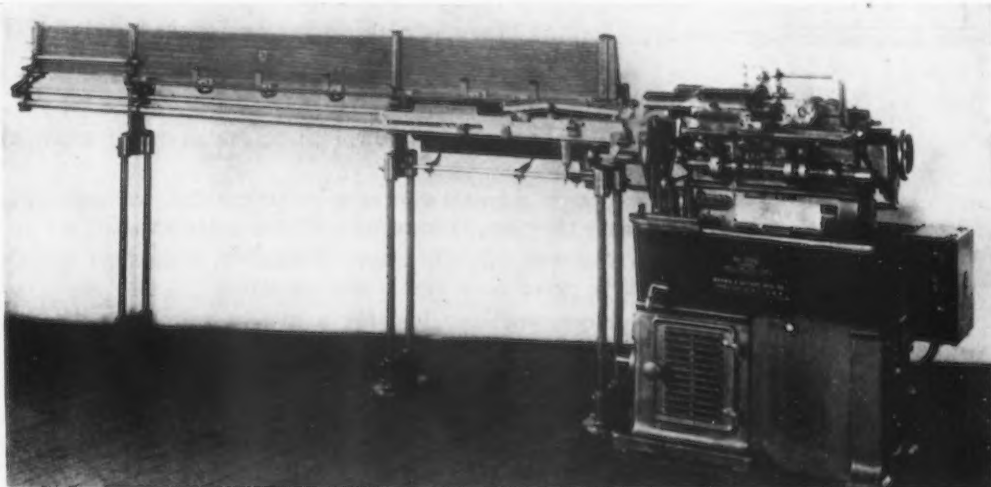
This torch, designated as the type RI, incorporates the features of the company's model NI torch, which is also a two-purpose unit. Features include the use of two gas tubes, made of stainless steel, instead of three tubes, and the high-pressure cutting oxygen thumb button which remains in the open or closed position without sustained pressure from the thumb. The torch head and valves are of bronze forgings of high tensile strength. The tool is well balanced and its light weight is emphasized as adapting it for continuous operations.

AUTOMATIC ROD MAGAZINE

Device for B&S Screw Machines Eliminates Time Lost in Waiting for Replenishment of Stock

AN external stock feeding mechanism, known as the automatic rod magazine, has been made available by the Brown & Sharpe Mfg. Co., Providence, for use on its automatic screw machines in the No. 00 size, including

A NEW Rod Is Fed Automatically to the Machine as the Preceding Rod Is Used Up, Operation of the Magazine Being Actuated by the Screw Machine. The mechanism of the magazine is controlled by the barrel cam, below, which is mounted at the rear. When set in motion, the cam trips the magazine and drops a new rod into feeding position. A pusher then feeds the rod forward



the regular and high-speed units and the screw threading machines.

This mechanism, designed to hold several rods, is located at the left end of the machine, as shown in the accompanying illustration, and is intended for use in place of the usual stock stands. The device is arranged so that a new rod is fed automatically into the working position as the preceding length of stock is exhausted. In addition to marked reduction of non-productive time, due to idleness of machines awaiting replenishment of stock, use of the device is emphasized as leaving the operator free to devote his entire time to the operation of the machine and the requirements of the work, as well as permitting one operator to attend to a greater number of machines.

The automatic rod mechanism is of simple design and is operated by the machine with which it is used. The mechanism is connected with the feeding arrangement of the machine in such a manner that when the end of the bar on which the machine is working passes a certain point, a ratchet is engaged which feeds a stop forward. This stop comes in contact with the starting lever of the machine at the instant the last piece is cut off, stopping the machine and at the same time engaging a clutch which delivers power to the rod magazine.

When the clutch of the magazine is engaged, a long barrel cam on the rear of the device is caused to rotate. The first movement of this cam trips the mechanism of the magazine and drops a rod into the feeding position. Continued rotation of the cam advances a pusher at the end of the mechanism, which comes in contact with the rod and feeds it forward through the feeding finger

and chuck to the desired position. As the follower of the cam comes to the end of its travel the starting lever of the machine is thrown into engagement and the machine is set in operation. The follower then returns to its starting position and the clutch of the rod magazine is thrown out of engagement. Operation of the mechanism is correctly timed with relation to the automatic functioning of the machine.

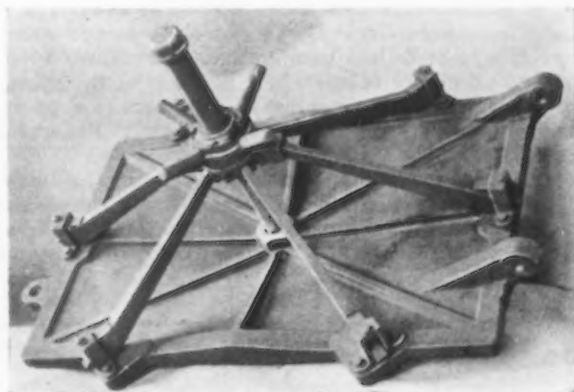
The simplicity of the mechanism and its automatic operation permit unskilled labor to be used in loading the magazine, which can be filled at any time. There

is no need for the machine to be stopped except when the tools need sharpening or attention to the work is required. The device is particularly advantageous for use in connection with the high-speed machines where the rapid rate of production requires more frequent replenishment of the stock. Patents, foreign and domestic, are pending.

Unusual Clamping Mechanism

A new type of manhole cover, designed by the United Filters Corporation, Hazleton, Pa., has an exceptional locking device. As illustrated, this is operated by screwing down on the capstan. The dogs are thus forced in under suitable clamps on the equipment to which the cover is attached. The result is said to be especially effective. The screw can be operated either by hand or by power control. It is patented.

One place in which this type of cover is being used



Quick-Adjusting Dogs Feature This Manhole Cover and Its Operation

is at the Calumet-Hecla mines. Here the ammonia stills must be opened frequently for removal of precipitated copper oxide. The ease of operation of this device fits it particularly for such conditions.

The Hopkins-Benedict Co., dealer in railroad supplies, has moved its Chicago office from 549 West Washington Street to 1529 Railway Exchange Building.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently of Trade Opinion, Indicate That:

Steel ingot output (adjusted) was lower in March and may taper off from recent high levels.

Unfilled orders showed a small decrease in March but remain higher than for two years past; they are "rounding off" for a decline.

Pig iron production was slightly above normal by a smaller margin than ingot output; early price recovery is not expected.

Finished steel prices, still too low for a proper relation with their raw materials, show little signs of advancing to a better position.

CORRECT statistical treatment of the available figures places the facts concerning the steel situation in March as follows:

"Adjusted" Production Figures Show Decline

IN the first place, the average daily production of steel ingots increased only 3.2 per cent, although the usual seasonal gain is a little over 4 per cent. If we eliminate the usual seasonal increase, therefore, and allow for a slight factor of normal growth, we find a small net decrease in March production. This means that the output of steel ingots failed to show a normal gain. Our adjusted index for the month is 105.1 per cent of normal, and compares with 106.1 in February, 105.5 in January and 106.9 a year ago. In short, each of the three months in the first quarter of 1928 showed about the same annual rate of production and each was about 5 per cent above normal. Compared with a year ago, January showed a gain, February was about the same, while March was lower. The trend in the first quarter was about sideways, with a very slight downturn in the last month.

In the second place, the unfilled orders of the Steel Corporation decreased 62,900 tons in March. Some decline in March is a usual and normal occurrence, the most common condition being a drop of about 1½ per cent from February. The decline last month was, if anything, a trifle less than normal. Our adjusted index of unfilled orders becomes 96.1 per cent of the average of the last five years, against 95.9 per cent in February, and 78.8 per cent in March, 1927. This is the highest index since March, 1926.

The most notable fact about the unfilled orders curve, however, is the way in which it has rounded off, during the last three months each increase in the adjusted index being less than in the preceding one.

Usually such a development indicates that production and shipments are gaining on new orders.

Very close similarity may be seen between the recent situation and that which existed from February through June, 1923. This appears both as to unfilled orders and the production of steel ingots. From April through July, 1923, the production curve was practically level and from February to May the unfilled orders curve tapered off as it has been doing of late. Then came a recession. In recent years it has been usual to find that a flattening out or a decline in the adjusted curve of ingot production has been followed or attended by a declining trend in the unfilled orders. One point suggested by our analysis is that the failure of unfilled orders to increase in March, while production declined slightly (as adjusted), may be taken to indicate that new orders fell off.

Of course, the analogy between the 1923 period and the present is by no means perfect: Forward buying of steel is small; prices are lower. While it seems that the chart indicates some decline within a month or two, there is now apparent no basis for any such recession as came in August, 1923.

In the third place, the average price of finished steel has held fairly steady, in spite of the above-normal production and the apparent decline in demand as indicated by the tapering of unfilled orders. **THE IRON AGE** composite of finished steel prices averaged 2.361c. in March, against 2.360c. in February and 2.367c. a year ago. The March average is 93.5 per cent of the average of the last five years. At present writing a further slight increase appears, the composite standing at 2.362c. But the price level has been practically unchanged, and this action is analogous to the trend of prices between April and July, 1923. Unfilled orders are much lower than in the earlier period, but there has been heavy buying for current requirements. There

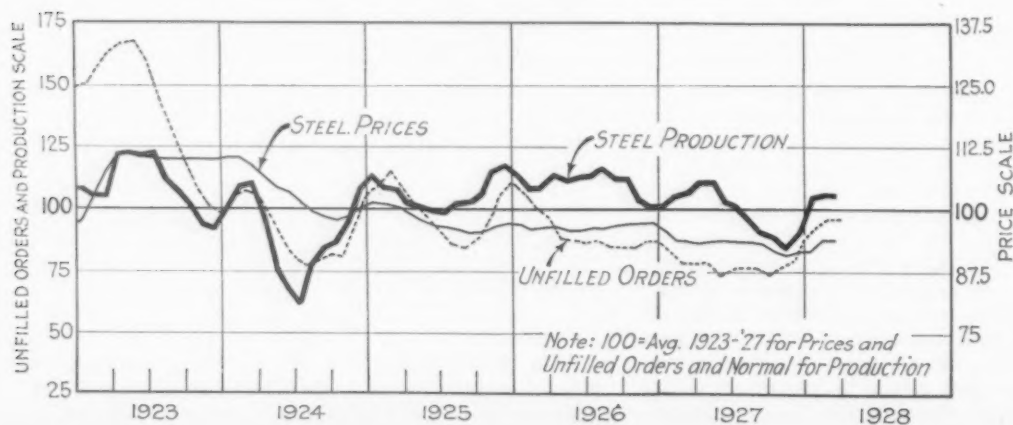
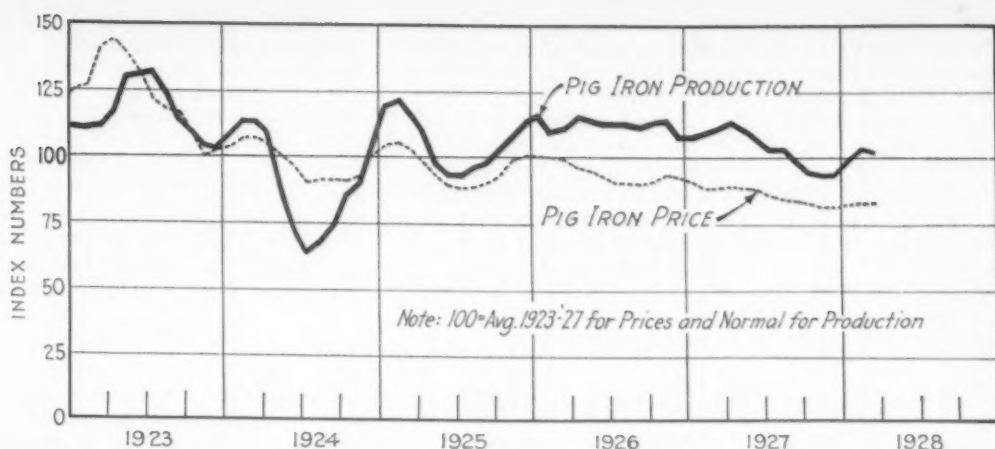


Fig. 1—Steel Production Increased by Less Than the Seasonal Amount. Prices have held fairly steady. Unfilled orders are rounding off, after substantial gains

Firmness in Pig Iron Prices Appears Logical with Pig Iron Output in March Only 2 Per Cent Above Normal (with All Adjustments Made)



seems to be no reason to expect much change in the average price of the chief items of finished steel during the next month or two as the somewhat larger volume of unfilled orders should help to maintain the market.

Little Change Indicated in Pig Iron Prices

PIG iron production figures, when subjected to careful statistical analysis, indicate a more considerable decline in March than was shown by the steel figures. Usually the pig iron output is about 5 per cent larger in March than in February. Last month there was actually an increase of only about 3.2 per cent. Accordingly, our adjusted index declined, being only 102 per cent of normal in comparison with 104.2 per cent in February and 111.8 per cent a year ago.

Pig iron production in March was 2 per cent above normal, while steel production was 5 per cent above. The ratio of the steel output to the pig iron output is a little above normal, which usually means greater strength in the pig iron market. Usually, too, this condition indicates a fairly sound general business situation. Incidentally, we find here a considerable difference between the situation in the middle of 1923 and the present, for in the earlier year the pig iron output was decidedly excessive in comparison with steel-making requirements.

As to pig iron prices, THE IRON AGE composite averaged \$17.72 in March, which compares with \$17.73 in February and with \$19.04 a year ago. Pig iron prices were only 82.8 per cent of the average of the last five years, which is relatively much lower than the average of finished steel prices. At present writing pig iron prices average \$17.67, or somewhat lower than the average for March.

Thus the markets for pig iron are rather weak,

in spite of the relatively large volume of steel production. Analogy offers little assistance in this case. Perhaps the most similar situation is found in May, 1927, when pig iron prices were sagging; but the comparison is imperfect in that now the production of pig iron is considerably lower and the same may be said of prices. In May, 1927, too, the price of bituminous coal was on the decline, and was actually lower than in March, 1927, the *Coal Age* composite price having been \$1.87 in the earlier period, against \$1.92 last month. In view of the relatively small volume of pig iron production and the low price of fuel, it does not seem probable that the price will decline in the near future. Firmness would seem more logical. Not much change in either direction, however, is indicated.

Prices Less "Out of Joint" Than They Were

GENERAL price relations in the iron and steel industry seem quite uncertain. Basic materials such as coke, steel scrap and pig iron are at or near bottom levels and are "about right" in their relationship to one another. Heavy melting steel scrap might go lower, judged by precedent, and the temporary strength in some markets of late appears to be due chiefly to local shortages of some grades of old material. Billets also appear to be fairly low and likely to be maintained at present levels, though it would be logical to find some weakness in sheet bars.

Such items of finished steel as bars, nails and sheets are relatively low in comparison with the foregoing materials. Of the three items, nails are comparatively high and show a spread over billets and raw material which is nearly normal. The spread between bars and nails is fully normal. But bars are fairly low, though they have been much cheaper at certain periods in the

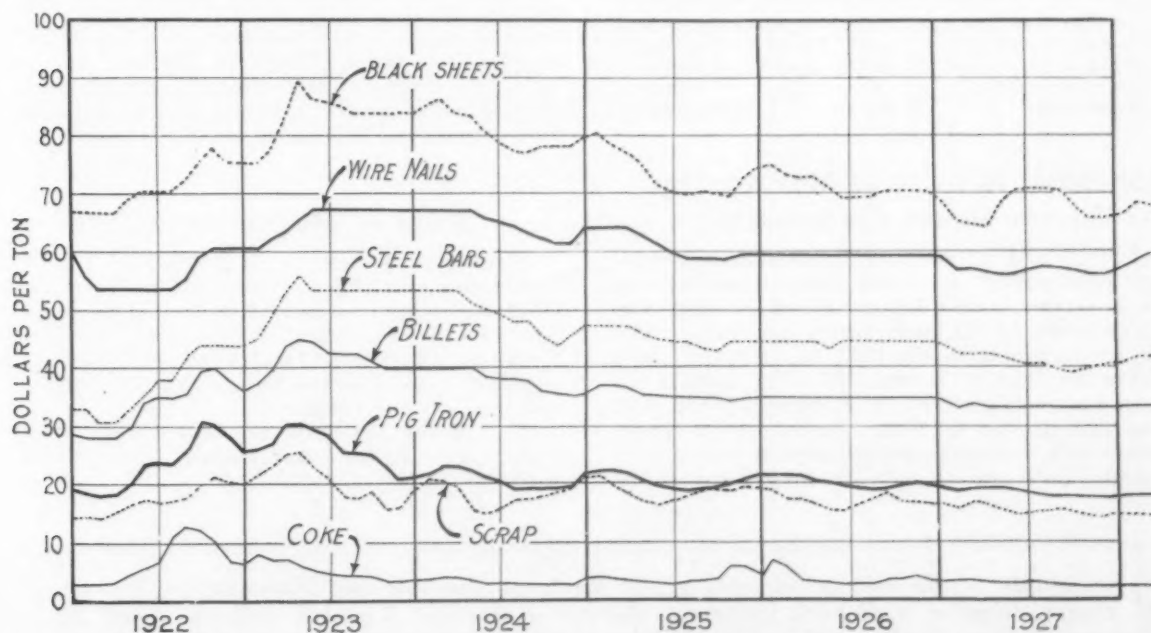


Fig. 3—Finished Steel Prices (in Particular, Sheets, Nails and Bars) Are Relatively Low, Compared with Semi-Finished and Raw Materials. Sheets have had their regular spring decline. Sustained improvement is not indicated

past. Sheets are very low, but may go still lower. Rarely indeed does the monthly average of sheet prices decline a little, as it did last month, without falling further. There has been a spring decline in sheet prices in each of the last five years. It seems difficult to escape the conclusion that the production of sheets must be somewhat excessive at present, in view of the weakness in this product while automobile production is gaining.

Concessions in the price of plates are reported, and the accuracy of such reports may be accepted, inasmuch as orders for railroad equipment are so backward.

MARCH SHEET SALES LARGE

Month's Total of Nearly 400,000 Tons by Independents Best Showing with One Exception Since September, 1926

March sales of independent sheet steel manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers were 399,441 net tons and, excepting last December, when they amounted to more than 530,000 tons, they were the largest in any month since September, 1926. March sales were more than 133,000 tons greater than those of the month before and exceeded those for January by approximately 97,000 tons. Shipments were approximately 40,000 tons less than the sales, but there was no such increase in the unfilled orders. This item at the end of March was 675,196 tons, or about 8000 tons more than at the end of February.

In view of the fact that production last month is stated to have been 103 per cent of capacity, it appears that potential capacity ratings are too low. Production for several months is known to have been six or eight points in excess of the rate of mechanical operation. The reckoning of capacities appears to hang a little more heavily upon mechanical performance than upon what has been done in actual practice.

Figures for March with comparisons follow:

| | March | February | January |
|--------------------------------|---------|----------|---------|
| Total No. of mills..... | 721 | 718 | 720 |
| Capacity for month.... | 492,150 | 461,750 | 486,550 |
| Per cent reporting..... | 72.3 | 72.6 | 72.6 |
| Sales | 399,441 | 266,210 | 302,921 |
| Production | 366,127 | 330,565 | 316,541 |
| Shipments | 359,532 | 298,420 | 274,126 |
| Unfilled orders | 675,196 | 667,054 | 694,197 |
| Unshipped orders | 110,702 | | 110,945 |
| Unsold stocks | 53,144 | | 59,508 |
| <i>Percentages to Capacity</i> | | | |
| Sales | 112.4 | 79.5 | 85.7 |
| Production | 103.0 | 98.7 | 89.6 |
| Shipments | 101.1 | 89.1 | 77.6 |
| Unfilled orders | 189.9 | 199.2 | 196.5 |
| Unshipped orders | 31.1 | | 31.4 |
| Unsold stocks | 15.0 | | 16.8 |

Industrial Activity as Measured by Electric Power Consumption

Industrial activity in March, based upon electric energy consumption by about 3000 manufacturing plants, is estimated by *Electrical World* at 118.2, compared with 100 in the basic period 1923-1925. This shows a reduction from the 127.7 in February, but a gain over the 116.8 of March, 1927. The average for the first quarter is given as 121.4, compared with 116.3 for the first quarter of 1927. Reductions in March, compared with February, are reported in rolling mills and steel plants and in metal-working plants, these

On the whole, demand for steel appears to have slackened some last month, reflecting the indicated decline in our composite demand line (page 1018, April 12). The slackening of building activity cannot but affect the demand for steel unfavorably. At the same time, production is considerably above normal and probably a little above the usual relationship with the average activity of the chief consuming industries, though not much. The whole situation, therefore, does not seem to indicate the possibility of any considerable or sustained advance in steel prices.

two constituting the metal industries group. Reductions are shown also in leather, textiles, lumber, automobiles, stone, clay and glass, paper and pulp, rubber, chemicals, foods and shipbuilding. Compared with a year ago, however, all of these groups, except shipbuilding, textiles and rolling mills and steel plants, showed gains.

British Iron and Steel Output in March Largest This Year

LONDON, ENGLAND, April 16 (*By Cable*).—Pig Iron output in March was 592,600 gross tons while that of steel was 793,300 tons, castings included. Both are the largest this year.

A comparison of the March production with February and January and with the monthly rate for previous years is shown in the following table in gross tons:

| | Pig Iron, Tons | Steel Ingots and Castings, Tons |
|---------------------------|----------------|---------------------------------|
| 1913—Average monthly..... | 855,000 | 638,600 |
| 1920—Average monthly..... | 669,500 | 755,600 |
| 1922—Average monthly..... | 408,500 | 490,100 |
| 1923—Average monthly..... | 620,000 | 706,800 |
| 1924—Average monthly..... | 609,900 | 685,100 |
| 1925—Average monthly..... | 519,700 | 616,400 |
| 1926—Average monthly..... | 203,500 | 296,700 |
| 1927—Average monthly..... | 607,800 | 758,200 |
| 1928—January | 560,600 | 626,200 |
| 1928—February | 550,800 | 764,400 |
| 1928—March | 592,600 | 793,300 |

Metal Statistics for 1928

The twenty-first annual edition of "Metal Statistics, 1928" has just been issued by the American Metal Market Co., 11 Cliff Street, New York. Various new tables have been added to the general assortment of statistical information on ferrous and non-ferrous metals that features previous issues of this handbook. One new table entitled "The Distribution of Steel in 1927" is adapted from the compilation in *THE IRON AGE*, Jan. 5, 1928, and gives the percentage of each class of steel passing into respective consuming lines. Including advertisements and indexes there are 552 pages.

Sales of Mechanical Stokers

Mechanical stokers to the number of 123, with a total rating of 43,425 hp., were sold in March, against 85 of 43,643 hp. in February, according to reports received by the Department of Commerce from 12 establishments. Of those sold in March, 31 of 5078 hp. were installed under fire-tube boilers and 92 of 38,347 hp. under water-tube boilers.

Except for February, the March rating was the highest reported since last August. It compares with 49,694 hp. in March, 1927.

Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: April 26—General Business Outlook; May 17—Activity in Steel Consuming Industries; May 24—Position of Iron and Steel Producers.

Continental Export Trade Smaller

British Hematite Competes in France—Swedish Miners' Strike Nearing End
—About 200,000 Metal Workers Out in Germany

(By Cable)

LONDON, ENGLAND, April 16.

THE Cleveland pig iron market is still quiet and forward buying is restricted, but makers of foundry grades are fairly well booked with orders and are not pressing for sales.

Considerable competition between British and French pig iron is reported in French coastal districts. British makers are considering the possibility of increased sales to Europe in the near future, if labor troubles develop there.

There is improved export demand for hematite iron, but domestic buying is still slow, with makers maintaining a fairly firm attitude despite large stocks. Foreign ore prices are firm, although new business is small, most mines being well sold ahead. It is believed that the Swedish iron miners' strike is nearing termination.

Demand for finished steel is unsatisfactory, particularly for export, which is stagnant and there are no signs of an early revival. Purchasing of Continental material in this country is slow, but prices are steadier as a result of less insistent German of-

fers and the well-booked condition of French plants.

Tin plate is firm as a result of good business and a more hopeful outlook. It is quite possible that makers may raise the minimum selling price to 18s. 3d. (\$4.45), f.o.b. works port, at the Swansea, Wales, meeting, April 17. Meanwhile mills are well booked and contracts are reported to have been made for delivery to the end of the year.

Galvanized sheet prices are steady. Black sheets are quiet with some Japanese buying.

Central European wire rod mills are still outside the International Wire Rod Cartel, but have agreed to maintain prices at the cartel level. The reported desire of French mills to withdraw from the International Steel Cartel is strongly denied.

The Pont-a-Mousson works in France has secured an order for 2500 tons of cast iron pipe for Vienna, Austria. In Luxemburg the Acieries Reunies de Burbach-Eich-Dudelange has blown out a furnace at Esch for modernization.

The German labor situation is unsatisfactory. About 200,000 metal workers are now striking or locked out in Saxony.

FRENCH EXPORT PRICES WEAK

Trade Limited but Stocks in Foreign Markets
Believed Low—Domestic Market Good

PARIS, FRANCE, April 6.—The export situation is rather confused, with buyers seeking lower prices and mills, on the strength of orders on their books, trying to maintain the present level. While there was a slight recession of prices at the end of March, bars and beams were the principal products affected and this was the result of German competition, which also appeared to a less extent on light-gage sheets. Export business is rather limited, but it is believed that there is a considerable volume of unsatisfied requirements in world markets, so that further recession in prices is not generally expected by producers.

Domestic business continues good, despite the slackening in export trade, and prices are firm. While the present satisfactory situation is attributed partly to the formation of a selling syndicate for semi-finished material and beams, replenishment of greatly depleted stocks has also been a factor.

Pig Iron.—Despite low British quotations the export market is still firm. Phosphoric foundry iron is being quoted at £3 4s. per ton (\$15.59), f.o.b. Antwerp, for purchases of about 2500 tons. Prices on basic iron are somewhat depressed and range from £2 16s. to £2 17s. (\$13.64 to \$14.15) per ton, f.o.b. Antwerp. At a meeting, March 29, the Entente of French-Belgian-Luxemburg Pig Iron Producers agreed to maintain the present price level and fixed 16,000 tons as the total to be offered for May delivery to domestic users. Export prices quoted on foundry grade are: For Great Britain and overseas countries, £3 15s. 6d. (\$18.39) per

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.87 per £ as follows:

| | £0 17s. | to £0 18s. | \$4.15 to \$4.39 |
|--|---------|------------|------------------|
| Durham coke, del'd. | 1 2 | to 1 2½ | 5.36 to 5.48 |
| Bilbao Rubio ore* | 3 8½ | | 16.56 |
| Cleveland No. 1 fdy. | 3 6 | | 16.07 |
| Cleveland No. 3 fdy. | 3 5 | | 15.83 |
| Cleveland No. 4 fdy. | 3 4½ | | 15.71 |
| Cleveland No. 4 forge | 3 15 | to 3 15½ | 18.27 to 18.39 |
| Cleveland basic (nom.) | 3 10 | | 17.05 |
| East Coast mixed... | 3 10½ | | 17.17 |
| East Coast hematite | 7 15 | to 8 0 | 37.75 to 38.96 |
| Rails, 60 lb. and up. | 6 0 | to 6 10 | 29.22 to 31.66 |
| Billets | 13 10 | | 65.75 |
| Ferromanganese | 13 0 | to 13 5 | 63.31 to 64.53 |
| Ferromanganese (export) | 5 7½ | to 5 15 | 26.18 to 28.01 |
| Sheet and tin plate bars, Welsh | 0 18 | to 0 18½ | 4.39 to 4.51 |
| Tin plate, base box. | 13 5 | | 64.53 |
| Black sheets, Japanese specifications. | 7 12½ | to 8 2½ | 1.66 to 1.77 |
| Ship plates | 9 2½ | to 9 12½ | 1.98 to 2.09 |
| Boiler plates | 8 2½ | to 8 12½ | 1.77 to 1.99 |
| Tees | 7 7½ | to 7 17½ | 1.60 to 1.71 |
| Channels | 7 2½ | to 7 12½ | 1.55 to 1.66 |
| Beams | 7 5 | to 7 15 | 1.58 to 1.69 |
| Round bars, ¾ to 3 in. | 10 10 | to 11 0 | 2.28 to 2.39 |
| Steel hoops | 9 15 | to 10 0 | 2.12 to 2.17 |
| Black sheets, 24 gage | 13 2½ | to 13 5 | 2.85 to 2.88 |
| Galv. sheets, 24 gage | 14 0 | to 14 5 | 3.04 to 3.10 |
| Cold rolled steel strip, 20 gage, nom. | | | |

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

| | (Per Metric Ton) | |
|------------------------|------------------|---------|
| Foundry pig iron (a): | | |
| Belgium | £3 3s. | \$15.34 |
| France | 3 3 | 15.34 |
| Luxemburg | 3 3 | 15.34 |
| Basic pig iron (nom.): | | |
| Belgium | 3 0 | 14.61 |
| France | 3 0 | 14.61 |
| Luxemburg | 3 0 | 14.61 |
| Coke | 0 18 | 4.39 |
| Billets: | | |
| Belgium | 4 12 | 22.41 |
| France | 4 12 | 22.41 |
| Merchant bars: | | |
| Belgium | 5 5 | 1.16 |
| France | 5 5 | 1.16 |
| Luxemburg | 5 5 | 1.16 |
| Joists (beams): | | |
| Belgium | 4 14½ | 1.04 |
| France | 4 14½ | 1.04 |
| Luxemburg | 4 14½ | 1.04 |
| Angles: | | |
| Belgium | 5 2½ | 1.13 |
| ½-in. plate: | | |
| Belgium (a) | 6 9 | 1.42 |
| Germany (a) | 6 9 | 1.42 |
| ⅝-in. ship plate: | | |
| Belgium | 6 5 | 1.33 |
| Luxemburg | 6 5 | 1.33 |
| Sheets, heavy: | | |
| Belgium | 6 1 | 1.34 |
| Germany | 6 1 | 1.34 |

(a) Nominal.

ton; for Holland, £3 7s. (\$16.32) per ton, f.o.b. Dutch frontier; for Italy, £2 19s. 6d. (\$14.50), f.o.b. Thionville; for Switzerland, 79.25 Swiss francs (\$15.67) per ton, delivered Basle. On large tonnages concessions are made from these prices. Negotiations are being continued for a revival of the association of hematite iron producers, which expired March 31, and a decision is expected soon. Meanwhile price concessions have begun to appear, and the recent increase in freight rates has not always been added to delivered prices.

Semi-Finished Material.—The shortage of semi-finished steel has disappeared, but prices continue fairly firm at £4 2s. to £4 6s. (\$19.97 to \$20.94) per ton, f.o.b. Antwerp, for blooms and £4 9s. to £4 12s. (\$21.68 to \$22.40) per ton for billets. Sheet bars range from £4 13s. to £4 13s. 6d. (\$22.65 to \$22.77) per ton.

Finished Material.—The irregularity of quotations that was in evidence a few weeks ago has been eliminated, but concessions for export business are beginning to appear. In the domestic market open-hearth steel prices have been advanced from 755 fr. (\$29.75) per ton to 830 fr. (\$32.70) per ton for small rolled products and from 730 fr. (\$28.76) to 805 fr. (\$31.72) per ton for large rolled products. Steel bars have settled to about £5 4s. per ton (1.14c. per lb.), and normal specification beams are quoted at £4 13s. to £4 14s. per ton (1.02c. to 1.03c. per lb.). The European Rail Makers' Association at its recent meeting decided to maintain rails at £6 7s. 6d. (\$31.05) per ton.

Japan Using German and Domestic Electrical Sheets

NEW YORK, April 17.—In the past, Japanese consumers of electrical steel sheets have obtained most of their requirements from the United States or Great Britain. Recently, however, these consumers have reported that German electrical steel sheets have been improving in quality, and the Shibaura Engineering Co. has just purchased a substantial tonnage of Bismarck motor sheets from the Thyssen mill of the Vereinigte Stahlwerke, Düsseldorf, Germany, at about \$98 per ton, c.i.f. Yokohama. This reported improvement in the quality of German electrical sheets recalls similar improvement in the quality of German light-gage black sheets, reported about two years ago. Since then, Japanese consumers have been fairly steady consumers of the German product, which, however, is produced in only a small tonnage.

Another factor that may tend to reduce Japanese purchases of electrical steel sheets in the United States and Great Britain is the growing importance of the Imperial Steel Works in Japan. Since beginning the production of electrical steel sheets, the Government works has had its product tried by various engineering works in Japan, and the opinion of these consumers seems to be that the product has been so improved as to place it in competition with foreign material. The only defect in the steel reported by the users is its irregularity in thickness, but with this defect eliminated, they state, it would rate as a first class product in the international market. The Government works is still working to improve its product, and, according to recent reports from Japan, successful production of high-grade electrical steel sheets is expected in the near future.

The annual capacity of the Government works in electrical steel sheets is estimated at 3000 to 4000 tons, while the annual consumption of such sheets by Japanese consumers is placed at 10,000 tons or more.

Large Shipments of Electric Industrial Trucks in March

March shipments of electric industrial trucks and tractors are reported by the Department of Commerce at 131 units, compared with 119 (revised figure) in February and 112 in January. Except for June and February of last year, the March total is the greatest since October, 1926. Of the total 16 were for export, while 18 tractors and 97 of other types were on domestic order.

URGES FRENCH USE OF STEEL

Per Capita Consumption in France Lags Behind That of Other Producing Countries

Increased domestic consumption of metallurgical products made in France was urged in a speech made recently by Maurice Fould, director of the Forges & Acieries de Pompey, at the Union des Industries Metallurgiques et Minières, Paris, before an audience of prominent representatives of the siderurgical, fabricating and consuming industries. Increased consumption of steel in France was declared to be one of the most urgent problems of the French metallurgical industry, says a report received by the iron and steel division, Department of Commerce, Washington, from the office of the American trade commissioner in Paris.

Steel consumption in France, according to M. Fould, increased from 4,293,000 metric tons in 1913 to 6,086,000 tons in 1926, a gain of 40 per cent. During the same period, owing to the acquisition of the large Lorraine plants and to the construction of new equipment in war-damaged plants, production increased from 4,687,000 tons to 8,386,000 tons, an increase of 80 per cent, or twice as much as the gain of consumption.

M. Fould compared this consumption with that of other nations to show "where the remedy lies." The following figures were given as showing the classification in 1926 of the principal steel-producing countries according to the annual steel consumption per capita (in parenthesis the consumption before the war, pig iron included, stated in kilograms, each kilogram being 2.2 lb.): United States, 411 kg. (372); Belgium and Luxemburg, 313 kg. (190); Germany, 155 kg. (261); Great Britain (in 1925), 152 kg. (236); France, 149 kg. (151).

The annual excess of production over consumption per capita, said M. Fould, is as follows: Belgium and Luxemburg, 383 kg.; France, 66 kg.; Germany, 42 kg.; United States, 15 kg.; Great Britain, 13 kg.

In 1927, the report says, France was obliged to export 52 per cent of its steel production. As a result of the war France has become one of the large metallurgical countries and to remain such, it was pointed out, it is necessary to develop its interior consumption. If not, it was explained, it cannot hope that exportation will permit it to find steady outlets for more than one-half of its production.

M. Fould indicated means employed by the United States and in Germany to increase consumption of steel and especially emphasized the organization and action of the Propaganda Abteilung recently formed by the Stahlwerksverband at Düsseldorf. He asked the interested industries and trades to organize a propaganda office in France and called attention to the importance of capital which should be placed at the disposal of the organization. M. Richemond, president of the Union des Industries Metallurgiques et Minières, made a proposal, which was accepted, to constitute an intersyndical committee to study the best means to carry out the policy urged by M. Fould.

Germany Replacing Minette With Swedish Iron Ore

WASHINGTON, April 14.—In addition to the iron mines in the Sieg, Lahn and Dill districts, which annually supply German blast furnaces with some 7,000,000 metric tons of 50 per cent iron content, Germany also draws extensively on the deposits in Sweden, Lorraine and Newfoundland, and less extensively on those of northern France, Norway, Spain and North Africa, says a report received by the iron and steel division, Department of Commerce, from Thomas Butts, trade commissioner at Berlin.

The marked dependence of Germany on foreign ores, it is stated, becomes more apparent when it is understood that the pig iron produced from the domestic ores during 1927 constituted only a little more than a quarter of the total production. Prior to the war Germany drew heavily on the ore deposits of Lorraine and Luxemburg, taking from the former about 21,200,000 tons and from the latter about 7,400,000 tons annually,

or more than enough to provide the ore for more than one half of the 10,000,000 tons of pig iron then being produced. Since the war, and especially during the past few years, Swedish ores have largely taken the place of those formerly secured in Lorraine, and in 1927 approximately 15,000,000 tons, with an iron content of nearly 65 per cent, was obtained from that source. It is probable that this figure will not be equalled in 1928, as the German ore reserves during 1927 were depleted, but have been since reconstituted.

If the present rate of pig iron production in Germany is maintained throughout 1928, it is calculated that about 1,000,000 tons of Swedish ore will be imported monthly, a volume sufficient to supply nearly three-fifths of the needs of the German industry. Ninette ore from Lorraine, with an iron content of about 35 per cent, is being imported into Germany at the rate of approximately 2,500,000 to 3,000,000 tons annually, while Newfoundland is the source of an additional 1,000,000 tons annually.

Germany Recovers Old Place in Machine Tool Industry

Exports Last Year Exceeded Those of United States—More Than Half of Imports Came From This Country—Russia Best Export Customer

THE rapid recovery of the German metal-working machinery industry is the subject of a bulletin by Theodore Pilger, American trade commissioner, Berlin, just issued by the Bureau of Foreign and Domestic Commerce, Washington. Conditions since the war, according to the report, have tended to stimulate the industry in Germany, with the result that the Germans have 865 factories with 65,000 workers, contrasted with 378 plants in the United States with 36,000 employees. Moreover, Germany now claims 46 per cent of the world's trade in metal-working and other closely related types of machinery, compared with America's 36 per cent. An increase in German metal-working machinery exports from 34,000 metric tons valued at \$12,700,000 in 1924 to 63,000 metric tons valued at \$27,700,000 in 1927 shows the rapidity with which foreign outlets are being developed.

Germany Passes United States in Exports

Although the total value of metal-working machinery manufactured in the United States in 1927 was nearly three times the value of the German product, \$175,592,488 compared with \$68,000,000, the German export value was \$27,700,000, compared with \$25,400,000 in the case of the United States. In other words, German manufacturers exported from 33 to 40 per cent of their product while in the United States exports were only 12½ per cent of total production. A further comparison of the industry in the two countries is shown in the accompanying table, which has been derived from census returns.

German Industry Seriously Over-Capacitated

Germany's census of 1921 showed 501 factories engaged in making metal-working machinery, with 50,000 employees. By 1925 there were 865 factories, employing 65,000 persons, an increase of 73 per cent in number of factories and 30 per cent in number of employees. As Mr. Pilger points out, "the machinery industry has organization, friendly government assistance, factories, workmen, engineers and raw materials enough to make tremendous inroads into the world's machine tool markets. The great needs in the German machine tool line now are sales organization, salesmanship and markets.

"There are from 90 to 100 German manufacturers of lathes of all kinds. This number of factories is sufficient to pour out an enormous overproduction. The same thing is true in almost every other type of machine tool, and these factories compete so vigorously that there is no profit for anyone except the buyer. Price is the outstanding factor in sales argument."

German Imports from the United States

As was the case before the war, the United States continues to furnish Germany with more than half its total imports of metal-working machinery. These imports were valued at 3,765,000 gold marks in 1926 and amounted to 58.8 per cent of Germany's total imports of this kind of machinery. Switzerland, Great Britain and Austria followed in the order named, supplying 9 per cent, 6.8 per cent and 5.6 per cent respectively.

The most striking development in Germany's exports of metal-working machinery in 1927 was the establishment of credit guaranties to Russia which resulted in that country's taking 30.6 per cent of Germany's total exports last year. In the previous year Russia took only 4.6 per cent of the total, but in 1913 Russia was a large buyer, taking 18.8 per cent. In 1927 Great Britain was second in the list of Germany's customers, taking 7.8 per cent of total metal-working machinery exports. Italy, the Netherlands, Switzerland, Czechoslovakia, the United States and France followed in the order named.

German and United States Metal-Working Industries Compared

| Item | Germany | United States |
|--|--------------|---------------|
| Number of factories..... | 865 | 378 |
| Salaried employees, proprietors and firm members | 65,107 | 36,825 |
| Number of horsepower.... | 75,113 | 147,418 |
| Horsepower per employee.. | 1.15 | 4.4 |
| Employees per plant..... | 75 | 95 |
| Value of product ¹ | \$68,000,000 | \$175,592,488 |
| Value of product per workman ¹ | \$1,000 | \$4,770 |
| Value exported: | | |
| 1913 | \$19,500,000 | \$16,097,000 |
| 1925 ² | \$18,400,000 | \$22,036,800 |
| 1927 ² | \$27,700,000 | \$25,400,000 |
| Export ratio, 1925 (per cent) | 33-40 | 12½ |

¹ Estimated for 1927.

² German export statistics for 1925 exclude "repairs in kind," while for 1927 these payments are included and accounted for 6.4 per cent of the total.

Czechoslovakian Steel Output Estimated at 1,500,000 Tons

WASHINGTON, April 14.—While Czechoslovakia is the only country among important steel producing nations that does not officially publish figures showing its total production, it has been indicated that the total output in 1927 was about 1,500,000 tons of steel ingots, says a report to the Department of Commerce from Prague. This is calculated from the fact that the Czechoslovak industry last year exceeded its quota of 1,429,000 metric tons in the Continental Steel Entente by about 70,000 tons. This figure also seems to be substantiated by the consumption of coke.

British Consider Marking Imported Bearings

WASHINGTON, April 14.—Applications have been received by the British Board of Trade for regulations requiring a mark of origin on ball and roller bearings and their parts, and on copper tubes and pumps (other than semi-rotary wing pumps) and their parts, according to the Board of Trade *Journal*, says a statement issued by the Department of Commerce. The same authority also says that applications have been received by the board to exempt specified cabinet furniture of metal from the order requiring a mark of origin, provided it is sold in a container indicating the origin by printing in a conspicuous manner.

MERCHANT MARINE URGED

Hearings Show American Ships Carry Less Than One-Third of Our Foreign Trade

WASHINGTON, April 17.—The vital importance of a first-class American merchant marine to the industries and people of this country perhaps was never better shown than during the recent hearings held before the House Committee on Merchant Marine and Fisheries. While great volumes of evidence have been presented on this perennial subject during the past three score years or more, that presented recently is held by those who have followed the subject to have been especially impressive. Legislation has been attempted ever since the Civil War to build up an American merchant marine and either has failed of passage or, if passed, has proved ineffective. One of the outstanding difficulties has been the general indifference to the subject, even by some who should be the most greatly concerned, including large industries that would be called upon to supply materials and would be benefited as exporters in American bottoms.

There now seems, however, to be greatly increased interest in the subject, and it was exhibited at the hearing before the House committee. The result has been the reporting out of a shipping bill which, significantly enough, has been unanimously approved by the committee.

As drawn, the measure carries features of the Jones bill passed by the Senate, but authorizes the sale of Government lines by a vote of five members of the Shipping Board instead of seven, as provided in the Senate bill.

Large Construction Loan Fund Proposed

Recognizing the necessity of Government aid to private shipping, the House measure increases the proportion that may be loaned for the construction of new ships from two-thirds to three-fourths of the construction costs, and reduces the rate of interest to the rate paid by the Government itself. The construction loan fund is increased from \$125,000,000 to \$250,000,000, making available a substantial sum of cheap money to shipbuilders. The bill also extends the term and increases the rates of mail pay, which will range from \$1.50 to \$12 per mile, depending upon speed and tonnage. The Postmaster-General is authorized to allow additional compensation for air mail from ship to shore and from shore to ship. This provision, it is believed, would insure the building and operation of six American four-day liners to ply between American and British and French ports, as proposed by the American Brown-Boveri Electric Corporation, New York. The ships, designed as airplane carriers, would be by far the fastest on the ocean, having a continuous speed of 33 knots per hour and a maximum of 35 knots per hour, about 9 knots faster than the present fastest liner.

Special Test of Imported Steel May Be Required

NEW YORK, April 17.—The use of imported structural steel in buildings erected in Greater New York is receiving serious consideration by the superintendents of buildings in the various boroughs. As a result of recent conferences it is understood that the city may require physical tests and chemical analyses of structural steel imported from European mills. Under this plan, a decision would be made, on the basis of material tested, as to whether the mill from which the steel originated was furnishing material of proper specifications. It is understood that May 21 has been tentatively set as the date before which such tests should be made by the importers, and the Columbia University testing laboratories are mentioned as the agency for carrying out such tests.

In the case of imported reinforcing bars, the Treasury Department, Washington, has announced its intention to appeal the recent decision of Justice I. F. Fischer, reported in *THE IRON AGE*, April 12, by which

Another important feature of the bill is a provision creating an insurance fund which the Shipping Board would use to insure any interest the Government may have in any vessel, through liens on loans, or otherwise. This feature has been pointed to as freeing American shipping from the necessity of turning to foreign marine insurance, heretofore a heavy handicap against the building of a privately-owned American fleet. Necessarily also the importance of a merchant marine as an arm of the national defense was taken into consideration.

Statistics were presented showing the millions of American money now paid out to foreign interests for passenger, freight and mail service. At the same time the utter depression of American shipyards and the vast loss to American industries which would supply the materials for ships, together with the loss suffered in the export trade by having to turn to the superior and faster foreign ships, were pointed out to the committee.

Edward C. Plummer, vice-chairman of the Shipping Board, pointed out that at the present time more than 5760 ships, of 26,000,000 gross tons, are employed in transporting the foreign commerce of the United States, and less than one-third of these ships are American vessels.

"The peculiar significance of that fact is this," said Mr. Plummer, "that, while our foreign competitors are continually blaming the United States for the over-tonnaged condition of the world, it is to be noticed that during the very period they have been complaining of this overtonnage, they have been building and, of course, building the most modern and economical vessels that can be produced."

Many Industries Involved in Shipbuilding

Illustrated by many exhibits, a statement was presented to the committee by H. G. Smith, vice-president of the Bethlehem Shipbuilding Corporation and also vice-president of the National Council of American Shipbuilders, showing the condition of the shipbuilding industry in the United States and what it means to the country. One of the exhibits showed that 146 industries, covering every State in the Union, are involved in the building of a ship. The materials coming from these States, with the value of each, were cited and covered a wide range, including steel, machinery, cotton, lumber, textiles, petroleum, ore, paints, glassware, flax, linseed, etc.

It was pointed out that shipyards of the United States are virtually idle and that trained staffs have almost disappeared. It would require 10 years, Mr. Smith said, to build up the required staff of engineers, draftsmen, scientific men and mechanics, but like others he expressed confidence that this could be done and a first class privately-owned American merchant marine be established with the proper Government aid, despite higher costs of labor and other handicaps in this country.

reinforcing bars would be dutiable at 20c. instead of 30c. per 100 lb. A brief has not yet been filed by the Government, so it is not yet known on what grounds the appeal is being made.

While New York importers of steel have submitted bids on several projects requiring substantial tonnages of bars, principally bridge construction, in most cases contracts are expected to go to American mills. Continental steel prices have declined slightly from the peak reached a few weeks ago, so that plain steel bars are quoted today at 1.73c. to 1.75c. per lb., base, duty paid, and shapes range from 1.63c. to 1.65c. per lb., base, duty paid, New York.

J. B. Booth & Co., 216 East Robinson Street, Pittsburgh, doing a warehouse business in iron and steel products, have added cold finished steel bars and shafting to their list of stock items. The product of the Columbia Steel & Shafting Co., Pittsburgh, is to be carried. Bars, plates, shapes, hoops, bands and welding wire are its other lines.

Foundrymen Announce Program

Many Subjects to Be Discussed at Sixteen Sessions at Convention in Philadelphia, May 14 to 18

THE program committee of the American Foundrymen's Association has prepared the following schedule of technical sessions for the thirty-second convention, to be held in Philadelphia, May 14 to 18:

MONDAY, MAY 14

Registration and committee meetings.

TUESDAY, MAY 15

9.30 a. m.—General Opening Meeting and Business Session; Chairman—President S. W. Utley.

11 a. m.—Non-ferrous Metals.

"Science in the Foundry," by E. F. Hess, Ohio Injector Co., Wadsworth, Ohio.

"Furnace Refractories for Brass Foundries," by H. M. St. John, Detroit Lubricator Co., Detroit.

"Risers, Their Need and Methods of Feeding," by R. R. Clarke, General Electric Co., Erie, Pa.

"The Effect of Melting and Pouring Conditions Upon the Quality of No. 12 Aluminum Alloy," by T. W. Bossert, Aluminum Co. of America, New Kensington, Pa.

11 a. m.—Steel Founding.

"Economies in Oxy-Acetylene Cutting for Riser Removing," by G. O. Carter, Linde Air Products Co., New York.

"Variables in Steel Foundry Practice," by F. A. Melmoth, Thomas Firth & Sons, Ltd., Sheffield, England. Annual exchange paper to be presented on behalf of the Institute of British Foundrymen.

"Interdependence of Operating and Sales Departments in the Success of a Foundry," by K. V. Wheeler, Lebanon Steel Foundry, Lebanon, Pa.

"Reducing New Sand Consumption in a Steel Foundry," by H. A. Mason, Gould Coupler Co., Depew, N. Y.

11 a. m.—Cast Iron Founding—Cupola Developments.

"Theory of Cupola Operation in Relation to Practice," by R. B. Schaal, Roberts & Manders Stove Co., Hatboro, Pa.

"Automatic Blast Gate Control for Cupola Melting," by H. V. Crawford, General Electric Co., Schenectady, N. Y.

"Refractories for the Cupola," by C. E. Bales, Ironton Fire Brick Co., Ironton, Ohio.

2.30 p. m.—Foundry Costs.

Report of committee on foundry costs.

"The Schedule Fallacy," by J. J. Ewens, George H. Smith Steel Casting Co., Milwaukee.

"Necessity for Creating a Castings Consciousness," by A. F. Jensen, Hanna Engineering Co., Chicago. Presented on behalf of the Foundry Equipment Manufacturers' Association.

WEDNESDAY, MAY 16

10 a. m.—Steel Metallurgy.

"General Characteristics of Alloy Steel Castings," by J. W. Frank, Chicago Steel Foundry Co., Chicago.

"Manganese Steel," by H. P. Evans and A. F. Burt, Pettibone-Mulliken Co., Chicago.

"A Modern Plant for the Heat Treatment of Miscellaneous Steel Castings," by A. W. Lorenz, Bucyrus-Erie Co., Milwaukee.

"Research Laboratory of the American Steel Foundries," by W. C. Hamilton, American Steel Foundries, Indiana Harbor, Ind.

Report of committee on steel castings.

Report of committee on heat treatment of ferrous castings.

Report of A.F.A. representative on joint committee on investigation of the effects of phosphorus and sulphur in steel.

10 a. m.—Cast Iron

"Influences of Carbon and Silicon Variations in Cast Iron," by D. G. Anderson and G. R. Bessmer, Western Electric Co., Chicago.

"Some Recent Developments in Cupola Metal," by J. D. Miller, Cresson-Morris Co., Philadelphia.

"Temperature Measurements of Molten Cast Iron," by H. T. Wensel and W. F. Roeser, Bureau of Standards, Washington.

"Test Bar for Testing the Chill of Cast Iron with Medium and High Silicon Contents," by M. Dudouet, Ecole Supérieure de Fonderie, Paris, France. Annual exchange paper of the French Foundry Technical Association.

"Heat Losses from a 75-Ton Hot Metal Car," by W. F.

Roeser, Bureau of Standards, Washington.

10 a. m.—Malleable Iron.

"Reducing Scrap in the Malleable Foundry," by R. A. Greene, Ohio Brass Co., Mansfield, Ohio.

"Effects of Various Elements on Malleable Cast Iron," by L. E. Gilmore, Crane Co., Chicago.

"The Need for Research in the Foundry," by E. E. Griest, Chicago Railway Equipment Co., Chicago.

"Oxidation Phenomena During the Annealing of Malleable Cast Iron," by H. A. Schwartz, National Malleable & Steel Casting Co., Cleveland.

"An Incentive Bonus Plan for Molders Based on Scrap Control," by R. J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich.

12.30 p. m.—Round Table Discussion on Brass Founding.

2.30 p. m.—Foundry Management.

"Basic Principles of Management in the Foundry," by J. D. Towne, Dayton, Ohio.

"Stabilizing Labor and Cutting Costs," by A. D. Lynch, Ohio Brass Co., Mansfield, Ohio.

"What Does the Buyer Expect for His Money?" by J. A. Marks, Packard Motor Car Co., Detroit.

"A Contribution to the Training of Labor and the Personnel of a Foundry," by A. Soupart, director of Musée Professionnel de l'Etat et des Ecoles Techniques de Morlanwez, Belgium. Annual exchange paper of the Belgian Technical Foundry Association.

2.30 p. m.—Foundry Coke.

Round table discussion of the present status of coke specifications.

"Presentation of Review of Status of Coke Specifications," by W. A. Selvig, United States Bureau of Mines, Pittsburgh.

THURSDAY, MAY 17

10 a. m.—Apprentice Training.

"The American Boy in the Foundry," by F. J. McGrail, Sheffield Works, Fairbanks, Morse Co., Three Rivers, Mich.

Reports of apprentice training in various foundry centers. Reviewed by F. A. Lorenz, American Steel Foundries, Indiana Harbor, Ind., and L. V. Park, Park & Williams, Inc., Philadelphia.

Discussion of apprentice training.

10 a. m.—Cast Iron.

"Theory or Practice in the Gray Iron Foundry," by John Shaw, Southsea, England.

"On Research Problems of the Gray Iron Foundry," by J. W. Bolton, Lunkenheimer Co., Cincinnati.

Report of committee on gray iron.

12.30 p. m.—Malleable Iron Round Table Discussion.

Following a luncheon gathering, an informal discussion of shop problems of the malleable foundry will take place.

2.30 p. m.—Sand Control.

"Surface Conditions of Castings as Affected by Core Sand Mixtures," by H. L. Campbell, University of Michigan, Ann Arbor, Mich.

"Testing Molding Sands for Durability," by M. A. Blakey, International Harvester Co., Milwaukee.

"Sand Conservation and Control in a Gray Iron Jobbing Shop," by T. F. Kiley, Brown & Sharpe Mfg. Co., Providence, R. I.

"Sand Control in a Light Casting Shop," by W. G. Reichert, Singer Mfg. Co., Elizabethport, N. J.

"A Compression Test of High Precision—The Colloid Nature of Natural Bond—The Effect of Heating on the Bond," by G. G. Brown, Ann Arbor, Mich., and C. C. DeWitt, Michigan College of Mines and Technology, Houghton, Mich.

Report of committees.

FRIDAY, MAY 18

10 a. m.—Materials Handling.

"Materials Handling and Its Relationship to Building Plans," by E. F. Scott, Austin Co., Cleveland.

"Determining Returns from Materials Handling Equipment," by J. J. Hartley, Link-Belt Co., Chicago.

"What Materials Handling Equipment Can Do for the Jobbing Foundry," by W. B. Marshall, Chain Belt Co., Milwaukee.

"Unloading Foundry Materials," by R. T. Turner, Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

"How to Determine When Materials Handling Equip-

ment Should Be Installed," by H. J. Dorus and C. S. Schroeder, Yale & Towne Mfg. Co., Stamford, Conn.

Course in Cupola Operation

AN innovation this year is a course on cupola operation. The schedule of the sessions is as follows:

Monday, May 14, 4 p. m.

Period 1—Principles Underlying Cupola Melting Process. Leader, Dr. Richard Moldenke.

Tuesday, May 15, 4 p. m.

Period 2—Cupola Construction Details. Leader, E. J. Lowry.

Wednesday, May 16, 4 p. m.

Period 3—Cupola Charging Practice. Leader, David McLain.

Thursday, May 17, 4 p. m.

Period 4—Cupola Improvements. Leader, H. W. Dietert.

European Exchange Papers

EXCHANGE papers are to be presented by representatives of three European associations with which the A. F. A. has exchange arrangements. F. A. Melmoth, manager of the steel foundry of Thomas Firth & Sons, Sheffield, England, will present the exchange paper of the Institute of British Foundrymen. His paper will be on variables in steel foundry practice.

M. Dudouet, of the Foundry High School of Paris, will present the exchange paper of the Association Technique de Fonderie, which is the technical foundry association of France. This paper will deal with test bars for determining the chill of cast irons with high and medium silicon contents.

A. Soupert, director of Musee Professional de l'Etat et des Ecoles Techniques de Morlanwetz, will present the exchange paper for the Belgian Technical Foundry Association. This paper will be a contribution to the training of labor and the personnel of a foundry.

Refractories Institute to Discuss Specifications

A feature of the annual meeting of the American Refractories Institute to be held at the Greenbrier, White Sulphur Springs, W. Va., May 8, will be the discussion of a selected list of specifications used by consumers in the purchase of refractories. An effort is being made to have a well-balanced attendance of consuming and producing interests. It is planned to discuss in detail the various phases of specifications and in a non-technical way to indicate their merits and faults.

A practical specification is one which ranges between the requirements for an ideal refractory and one which can be manufactured at a reasonable profit. It is believed that the discussion will be of considerable value to consumers in formulating more practical requirements and to manufacturers in obtaining ideas of the consumers as well as in learning more of the requirements of refractories in various furnace operations. This meeting is open to everyone interested in such specifications.

"Screening of Fire Clays" and "The Cause of Bulging in Hand-Made Shapes" are the topics of two of the papers to be presented.

Miss Dorothy A. Texter, 2202 Oliver Building, Pittsburgh, is secretary of the institute.

Gear Manufacturers Meet at Rochester

In addition to progress reports and recommendations of the association's several standardization committees, a number of addresses have been arranged for the twelfth annual meeting of the American Gear Manufacturers Association, which will be held at the Seneca Hotel, Rochester, N. Y., April 19, 20 and 21. Luncheon and an inspection visit to the Gleason Works is also to be a feature.

"Gear Lubrication" will be discussed by G. A. Round, assistant chief engineer Vacuum Oil Co., and "Non-Metallic Materials—The Part They Will Play in the Future of the Gear Industry," by T. C. Roantree, Westinghouse Electric & Mfg. Co. "Nitration of Steel," by W. H. Phillips, Molybdenum Corporation of America. "Contact of Standard Worm Gears," by J. C. O'Brien,

Pittsburgh Gear & Machine Co.; and "The Value of Research to the Present Day Manufacturer," by C. E. Skinner, assistant director of engineering, Westinghouse Electric & Mfg. Co., are among other addresses planned.

Dr. Dexter S. Kimball, dean of the College of Engineering, Cornell University, will speak at the informal banquet, to be held on the evening of April 20. E. J. Frost, president Frost Gear & Machine Co., will be the toastmaster and musical features will be furnished by talent from the Gleason Works.

American Gray Iron Institute to Meet in Philadelphia May 18

The American Gray Iron Institute, which was organized at a conference held in Pittsburgh, March 13, will hold a meeting in Philadelphia, Friday, May 18. This date, the last day of the American Foundrymen's Association's convention and exhibition, was chosen to avoid conflict with other activities and to permit the largest possible attendance of gray iron foundrymen.

The organization committee chosen at Pittsburgh held a meeting in Cleveland Tuesday, April 10, and set up a tentative plan of procedure for action at the Philadelphia meeting. The principles enunciated by the resolution adopted at Pittsburgh have been clarified and enlarged to include the purposes for which the American Gray Iron Institute was founded. These principles, which will be submitted to general discussion at Philadelphia, were published in *THE IRON AGE* March 15, p. 777.

The organization committee appointed at Pittsburgh includes the following gray iron foundrymen:

Walter L. Seelbach, chairman, Forest City-Walworth Run Foundries Co., Cleveland; A. E. Hageboeck, vice-chairman, Frank Foundries Corporation, Moline, Ill.; J. H. Bruce, Bowler Foundry Co., Cleveland; J. L. Carter, Barlow Foundry Co., Newark, N. J.; H. S. Chafee, Builders' Iron Foundry, Providence, R. I.; A. E. Clarke, Des Plaines Foundry Co., Des Plaines, Ill.; J. D. Coltman, Bullard Machine Tool Co., Bridgeport, Conn.; Horace R. Culling, Carondelet Foundry Co., St. Louis; Fred Erb, Erb-Joyce Foundry Co., Detroit; W. J. Grede, Liberty Foundry Co., Milwaukee; John Hartman, Atlas Foundry & Machinery Co., Tacoma, Wash.; B. H. Johnson, Cresson-Morris Co., Philadelphia; Angus Macdonald, Snead & Co., Jersey City, N. J.; Don McDaniel, Hamilton Foundry & Machine Co., Hamilton, Ohio; Edward B. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill.

Of this number, 13 attended the meeting of the committee in Cleveland, April 10.

The meeting in Philadelphia on May 18 will be held in the convention hall of Philadelphia Commercial Museum and will be called to order by B. H. Johnson, temporary chairman, who presided at the Pittsburgh conference. A speaker of national prominence, familiar with the problems of group action upon commercial and industrial problems, has been engaged for this occasion.

American Welding Society Announces Annual Program

American Welding Society will hold its annual meeting in the Engineering Societies Building, 33 West Thirty-ninth Street, New York, on April 25, 26 and 27. Wednesday, April 25, will be given over to meetings of the standing committees on pressure vessels, structural steel and nomenclature.

On April 26, the morning session will discuss papers on "Welding of Corrosion-Resisting Alloys" by W. B. Miller of the Union Carbide & Carbon Research Laboratories and "Building Up Rail Ends by Electric Arc" by H. E. McKee, Electric Rail Weld Service Corporation. In the afternoon the matters of qualification of welders, inspection and supervision will be considered from many angles by a group of speakers. In the evening the annual dinner will be held.

Friday morning, April 27, M. L. Eckman, welding supervisor Ford Motor Co., Detroit, will describe "Welding the Ford Car." In the afternoon the American Bureau of Welding (the research group of the society) will hold its annual meeting.

Organize for World Engineering Congress at Tokio

For the world engineering congress to be held next year in Tokio, an American committee was formally organized in New York, March 22, and officers elected as follows:

Honorary chairman, Herbert Hoover; chairman, Elmer A. Sperry, New York; vice-chairman and chairman of the executive committee, John W. Lieb, New York; vice-chairman, C. E. Grunsky (Pacific Coast), San Francisco; C. E. Kettering (Middle West), Detroit; executive secretary, Maurice Holland; executive committee, Gano Dunn, George W. Fuller, Maurice Holland, Frank B. Jewett, John W. Lieb, John H. McGraw, Calvin Rice and W. E. Wickenden, New York; Donald C. Jackson, Cambridge, Mass.; O. C. Merrell, Washington; Charles F. Scott, New Haven, and Elmer A. Sperry, Brooklyn.

Employee Representation Is Gaining Rapidly Over Trade Unionism

That employee representation, as expressed in works councils and company unions, is rapidly assuming the activities of trade unionism in most of the large mass production manufacturing industries was emphasized by William M. Leiserson, professor of economics, Antioch College, Yellow Springs, Ohio, in an address before the Academy of Political Science at the Hotel Astor, New York, on April 11. Professor Leiserson went on to say that this evolution in labor relations is not coming about because company unions are necessarily better prepared or situated to handle the interests of the laborer, but because they have taken the initiative and have succeeded in accomplishing smoothly and satisfactorily what trade unions have not seemed able to do without friction and poor management.

The speaker explained further that industrial executives had not hesitated to seek out men scientifically trained in personnel relations to conduct their activities in employee representation work, while trade unions had failed in many cases to recognize the need

for broadminded leadership. Until the unions realize the need for this sort of leadership, he pointed out, they will continue to fight a losing battle with the young but energetic competitor, employee representation.

"Industrial leaders, however," Professor Leiserson said, "are erring seriously if they believe that in creating company unions they have built up a passive and docile instrument for the handling of labor disputes. Employee representation does not deprive the workers of the right to strike, but on the other hand it does offer a more satisfactory means of arbitration than has been possible in the past with the majority of trade unions."

Features of Mechanical Engineers' Spring Meeting at Pittsburgh

The program of the spring meeting of the American Society of Mechanical Engineers, to be held at Pittsburgh, May 14 to 17, inclusive, includes the following papers:

Manufacture of Seamless Tubes, R. C. Stiefel and George A. Pugh, Aetna Standard Engineering Co., Ellwood City, Pa. Some Common Delusions Concerning Depreciation, Ernest F. DuBrul, general manager National Machine Tool Builders Association, Cincinnati.

Ball Bearing Machine Tool Spindles, Thomas Barish.

A Material Handling and Transport Organization, C. A. Fike.

High-Pressure Steam Boilers, George A. Orrok, consulting engineer, New York.

The Flow of Heat Through Furnace Hearths, J. D. Keller. Use of Pulverized Coal in Basic Open Hearth Furnaces, E. L. Herndon.

Combination Firing of Blast-Furnace Gas and Pulverized Coal, F. G. Cutler, chief Bureau of Steam Engineering, Tennessee Coal, Iron & Railroad Co., Ensley, Ala.

Locomotive and Freight Car Utilization, C. B. Peck.

Mechanical Properties of Aluminum Casting Alloys at Elevated Temperatures, R. L. Templin, C. Braglio and K. Marsh.

A Study of Tin-Base Bearing Metals, Part I. O. W. Ellis and G. B. Karelitz, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Training Minor Executives in a Rapidly Growing Organization, A. J. Beatty.

COMING MEETINGS

April

American Gear Manufacturers Association. April 19 to 21. Twelfth annual meeting, Hotel Seneca, Rochester, N. Y. T. W. Owen, 3608 Euclid Avenue, Cleveland, secretary.

American Society of Mechanical Engineers. April 23, 24. Meeting of materials handling division, Benjamin Franklin Hotel, Philadelphia. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Metal Trades Association. April 25, 26. Annual convention, Hotel Astor, New York. J. E. Nyhan, Peoples Gas Building, Chicago, secretary.

National Foreign Trade Council. April 25 to 27. Fifteenth annual convention, Rice Hotel, Houston, Tex. O. K. Davis, India House, New York, secretary.

American Welding Society. April 25 to 27. Annual meeting, Engineering Societies Building, New York. Miss M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Management Association. April 26, 27. Fourth financial executives' conference, Hotel Pennsylvania, New York. W. J. Donald, 20 Vesey Street, New York, managing director.

American Electrochemical Society. April 26 to 28. Spring meeting, Stratfield Hotel, Bridgeport, Conn. Colin G. Fink, Columbia University, New York, secretary.

May

Iron and Steel Institute. May 3 and 4. Annual meeting, House of Institution of Civil

Engineers, London, England. George C. Lloyd, 28 Victoria Street, London, S. W. 1, England, secretary.

American Refractories Institute. May 8 and 9. Annual meeting, White Sulphur Springs, W. Va. Dorothy A. Texter, 2202 Oliver Building, Pittsburgh, secretary.

American Society of Mechanical Engineers. May 14 to 17. Spring meeting, William Penn Hotel, Pittsburgh. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

American Foundrymen's Association. May 14 to 18. Annual meeting and exhibition, Commercial Museum, Philadelphia. C. E. Hoyt, 140 South Dearborn Street, Chicago, secretary.

Joint Machinery and Supply Convention. Joint meeting of Southern Supply and Machinery Dealers' Association, National Supply and Machinery Distributors' Association and American Supply and Machinery Manufacturers' Association. May 15 to 17. Nashville, Tenn. Alvin M. Smith, Smith Courteney Co., Richmond, Va., George Fernley, 505 Arch Street, Philadelphia, and F. D. Mitchell, 1819 Broadway, New York, secretaries.

American Steel and Heavy Hardware Association. May 22 to 24. Nineteenth annual convention, Copley-Plaza Hotel, Boston. Benjamin R. Sackett, 503 Arch Street, Philadelphia, secretary.

American Iron and Steel Institute. May 25. Annual meeting, Hotel Commodore, New York. E. A. S. Clarke, 75 West Street, New York, secretary.

Recent Experiments on the Cause of Hardness in Steel

Doctor Jeffries Believes Hardness of Martensite Is Due to Extremely Fine Grain of Iron Crystals and Critical Dispersion of Carbide Particles Therein

AT a meeting of the New York chapter of the American Society for Steel Treating, Dr. Zay Jeffries, consulting engineer Aluminum Co. of America, described recent researches into the nature of martensite, and their application to the riddle of "Why does steel harden?"

When he and his associate, R. S. Archer, some years ago proposed the "slip interference" theory of hardening, some difficulty was experienced in explaining the great hardness of martensite in freshly quenched high-carbon steels. The general theory seemed to demand an aggregate of very fine crystals with random orientations, within which are dispersed many particles of a second harder substance acting as keys to prevent one portion of the individual crystalline grain from sliding past another (normal plastic deformation). However, everyone knew that martensite under the microscope showed a relatively coarse structure of needle-like, interlocking crystals.

Martensite Has Many Visual Aspects

Since then it has become more acceptable to describe martensite in terms of the general conditions existing within the steel rather than as a particular microscopic appearance. In other words, martensite is thought of as the early stages in the series of changes which transform austenite (the solid solution of carbon in gamma iron) to pearlite (a mixture of visible ferrite and cementite crystals). Since there are at least three methods of transformation, there are three possibilities as to the structure of martensite. Furthermore, since it is generally accepted that the iron in martensite is in the alpha or body-centered modification, it should be fruitful to study the condition of the ferrite in the three varieties by the X-ray method.

A large single crystal of austenite which formed in an iron runner and transformed slowly into lamellar pearlite showed no relation between the orientation of the mother crystal and the ferrite flakes. Another large crystal of austenitic manganese steel was annealed to harden it and produce martensite; again the ferrite crystals had random orientation. A high-carbon steel, having coarse-grained austenite by a long high anneal, was quenched so the transformation occurred at about 200 deg. C. into the usual acicular martensite. In the latter the X-ray pattern indicated that the ferrite might be controlled to an extent by the cleavage planes in the austenite. In the light of these studies, and those of Young in England on meteoric iron, Jeffries concludes that the ferrite in martensite is at random orientations, or at most parallel in only one crystalline plane so the third axial direction can be almost anything. This random orientation is a condition which makes for great slip interference, and therefore hardens the metal.

Martensite a Complex Aggregate of Fine Crystals

F. F. Lucas has secured micrographs of martensite needles which demonstrate that these have a very fine complex structure.

Doctor Jeffries next inquired how much of the hardening of martensite is due to the fine grain of the random ferrite crystals present, and what proportion is due to the presence of carbon.

A nickel-iron (19:81) alloy with 0.006 per cent carbon was prepared having a coarse grain. Its Rockwell hardness was diamond cone 18—i.e., soft. After re-

melting to 0.012 per cent carbon, and cooling to 200 deg. C. in the furnace the grain was refined enormously, and the hardness was C36. This increase of 18 points is ascribed to grain refinement during transformation. (This same experiment, in Doctor Jeffries' opinion, disposes of the theory that hardness of quenched carbon steel is due to internal strains set up by the expansion taking place when gamma iron transforms to alpha iron. The nickel-iron alloy expanded during the transformation, and at a low temperature where the metal would be cold-worked thereby, but the total increase in hardness is only 18 Rockwell units.) When the same alloy has 0.05 per cent carbon and is cooled from 500 deg. C., it has a cloudy microstructure and hardness of C45. It is obvious that the principal cause of hardness here is grain refinement, and a very little carbon is sufficient for this purpose.

In plain steels carbon must not only lower the transformation (which is done by the nickel in the above experiment) and obstruct grain growth in the transformed material (which is done by no more than 0.012 per cent carbon in the nickel-iron alloy), but must also harden the alloy by its own presence. In the first stage of the transformation, carbon probably exists in solid solution in the ferrite; later it forms growing crystals of cementite.

Iron-Carbon Solid Solution Not Very Hard

To evaluate the hardness which may be expected from a solid solution of carbon in ferrite, the speaker referred to Sykes' iron-molybdenum alloys. Pure ferrite has a Brinell hardness of 70; ferrite is saturated with 6 per cent molybdenum and its hardness is then 130. A super-saturated solid solution containing 22 per cent molybdenum is 215 hard, and the same, when heated 50 hr. at 600 deg. C., enabling a hard compound to precipitate, has a hardness of 530. Evidently, the added hardness due to the hard compound, properly dispersed, is much greater than that due to the atomic dispersion of the compound's constituents in solid solution.

In summary, Doctor Jeffries said that these tests, made in alloys where the individual effect is unmasked by other factors, indicated that the hardness of martensite is due to the following factors:

- a. Random orientation of ferrite grains
- b. Extremely small size of ferrite grain
- c. Intrinsic hardness of carbon-iron solid solution
- d. Added hardness due to carbide precipitate.

While he is as yet unable to give definite or even relative values to the four hardening factors, one would gather that item c. is least effective, and items b. and d. are most.

Age-Hardening of Quenched Steel

As a general check on the assumption that freshly formed martensite is a supersaturated solid solution of carbon in alpha iron, from which carbon is being precipitated in the form of cementite crystals, Doctor Jeffries remarked that this view of the nature of martensite placed it in the same category with more than 20 alloy systems, all of which show age-hardening effects and follow general laws of age hardening, and all of which are due to the break-down of a solid solution with the formation of a second substance within the alloy. W. P. Sykes is now studying quenched high-

carbon steels and finds that they also show these age-hardening phenomena.

For instance, 1.23 per cent carbon steel quenched in iced alkali solution, has a hardness of C 64.9. After immersion in liquid oxygen this increased to C 66.2, with an increase in volume, indicating that the added hardness is due to the transformation of residual austenite. Either of these samples, when held at room temperature, increase in hardness with time; for instance, the oxygen-quenched sample in 5 hr. measures C 67.1; in 100 hr., C 68.3; in 800 hr., C 69.8. However, these increases in hardness are accompanied by a contraction in volume, showing that the added hardness is from a different cause than transformation of re-

maining traces of austenite. Study of hardness tests taken after aging at different temperatures shows them to possess the same mutual relationships as do similar data for duralumin, for instance, and indicate an essential similarity in action between martensite and the other age-hardening alloys. This agrees entirely with the requirements of the slip interference theory of hardening—namely, that the size of precipitated carbide in martensite may be too small on fresh quenching to give maximum hardness. This critical size and maximum hardness may, however, be attained after aging for the right time at the right temperature. Longer aging at that temperature causes a slight softening, as theory demands.

Lower Freight Rate on Tin Plate from San Francisco to Sacramento Denied

WASHINGTON, April 17.—In a decision made public last week, the Interstate Commerce Commission held that the proposal of the Western Pacific and other railroads to reduce from 18.5c. to 9c. per 100 lb. the rate on tin plate, in carloads, from San Francisco and other San Francisco Bay points to Sacramento, Cal., shipped by water from the Atlantic seaboard, is not justified. The schedules were ordered canceled. Protests against the proposed reduction were made by water carriers and others, while the United States Steel Products Co. supported the rail lines.

The report said that tin plate moves from the Atlantic seaboard by water through the Panama Canal to San Francisco, where it is transshipped to Sacramento, and that practically all of it is made into containers and exported by the Sacramento plant of the American Can Co. The plant, it was stated, will use about 250,000 net tons annually, of which a small portion moves all-rail from such manufacturing points as Gary, Ind., and Pittsburgh. The rate of the Sacramento Navigation Co. from San Francisco to Sacramento is 10.5c. per 100 lb. There is also a switching charge of 34c. per net ton at Sacramento, of which the boat line absorbs 15c., making a through charge of \$2.29 per net ton to the plant of the American Can Co. According to the decision, the United States Steel Products Co. had said it was not satisfied with the water service, and that the business would be taken from the boat line and its own barge service established if the lower rail rate were not established.

Steel Co. of Canada Profits Off Slightly Last Year

Profits of the Steel Co. of Canada, Ltd., Hamilton, Ont., for the year ended Dec. 31, 1927, amounted to \$11.64 a share on combined common and preferred stock, as compared with \$12.38 in 1926, and \$10.10 in 1925. Manufacturing profits for 1927 amounted to \$3,166,280, compared with \$3,247,606 in 1926 and after adding investment income and deducting depreciation, sinking fund requirement, bond interest, etc., the amount available for dividends was \$2,095,373, as against \$2,229,211 in the previous year.

Heavier Trackwork Production

March production of trackwork for T-rails of 60 lb. a yard and heavier is reported at 15,058 net tons by the American Iron and Steel Institute. This shows a considerable gain over the immediately preceding months and is the largest total since last May. It compares, however, with 19,216 tons in March, 1927, and with 19,756 tons in March, 1926.

Total production for the first quarter is given at 35,761 tons. This compares with 45,863 tons in the first quarter of last year and 51,161 tons in the first quarter of 1926. The current figure is the smallest for any quarter in more than two years, with the exception of the last quarter of 1927.

Steel Shippers and Users in Chicago District Object to Rise in L. C. L. Rates

WASHINGTON, April 17.—Manufacturers, dealers and consumers of iron and steel products in Illinois, Iowa and Wisconsin have filed a petition with the Interstate Commerce Commission asking for reconsideration and modification of its decision justifying the railroads in cancelling existing commodity rates on iron and steel products in less-than-carloads, and placing them on a full classification basis in Illinois Freight Association, Western Trunk Line and Central Freight Association territories.

The petition declares that the findings of the commission are not based upon the evidence in that the railroads made no effort to justify the proposed increases. Instead, it is contended, witnesses for the railroads upon cross-examination specifically stated that their testimony in justification of the proposed cancellation of commodity rates for less-than-carloads generally did not apply to the rates on iron and steel and for this reason, it is pointed out, the protestants did not introduce evidence in support of the present adjustment of rates.

Cement Production Undergoing Seasonal Expansion

Production of Portland cement in March is reported by the United States Bureau of Mines at 10,223,000 bbl. This represents a seasonal gain over the 8,797,000 bbl. of February. The output, however, is more than 10 per cent below that of last March, which was 11,450,000 bbl.

Shipments in March were 10,135,000 bbl., compared with 11,100,000 bbl. a year ago. Stocks at the end of March were 27,436,000 bbl., a slight gain over a month earlier and the heaviest in more than a year. This increase again is seasonal, as the stocks last year at the end of March were heavier than at any other time during the year. Shipments normally exceed production in each month from April to October inclusive.

Pittsburgh Steel Co. Completes Financing for Plant Betterments

Stockholders of the Pittsburgh Steel Co., Pittsburgh, last week approved a bond issue of \$16,000,000, of which \$11,000,000 has been issued and the remainder has been reserved in the treasury for later issuance in connection with the building of a by-product coke plant. From the proceeds of the bonds sold, \$2,000,000 has been appropriated for plant improvements, which include general electrification of the Monessen plant, involving a new boiler plant to operate at 400 lb. per sq. in. steam pressure with 200 deg. superheat; partial electrification of mill drives at that plant, and changes in the automatic mills at the Allenport, Pa., works to make possible the rolling of hot finished tubes to 40 ft. lengths, as against 24 ft., the present maximum length. Additional heating furnace capacity also will be installed at this works. The remaining \$9,000,000 will be used to refund existing indebtedness.

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This Issue in Brief

Outstanding quotations provide machinery builder with a yardstick for measuring raw material needs. He knows from experience about what proportion of quotations will be converted into orders, and is thus able to estimate closely his requirements.—Page 1068.

Shop policies are decided by supervisory committee. All important matters relating to production in machinery-building plant are passed on by board consisting of the general manager and his assistant, chief engineer and two superintendents.—Page 1071.

Eliminates time lost in replenishing screw machine stock by means of automatic rod magazine. A new rod is fed automatically into working position as the preceding length of stock is exhausted.—Page 1091.

What of iron and steel prices? Though finished steel prices are still too low for a proper relation with their raw materials, they show little indications of advancing to a better position, says Dr. Haney. Signs point to little change in pig iron prices. Pages 1092 and 1093.

"Standard" manufacturing procedure is unknown in Ford plant. All things are in a state of flux. Improvements are continually being made, and some of the best suggestions come from the men on the job. Discovery of a better method or material means its adoption.—Page 1082.

Improves appearance of galvanized pipe by eliminating water dip. A better spangle finish is thus obtained in the new Bethlehem pipe plant. Lap weld mills have driven roller conveyors throughout for handling the pipe from operation to operation.—Page 1088.

Air-hardening properties of chrome-molybdenum steel tubing and sheets make them preferred materials for airplane construction. Heat-treating by quenching is impracticable because of the size of the welded structures.—Page 1077.

Though minimum labor turnover is the greatest safety factor in any plant, health is increasingly important, says Westinghouse executive. Advocates regular physical examination of workers as a means of cutting the accident rate.—Page 1079.

Time lost in getting tools is cut by four-sided tool room in center of shop. Each worker has ten metal tool checks. He leaves a check when he takes a tool, and the check is placed on the rack from which the tool has been removed.—Page 1071.

Steels having unusual properties are produced by active bath movement in high-frequency induction furnace. A steel bath, under a normal refining slag, was brought from 0.14 per cent carbon to 0.03 per cent in 2 min. Another steel, with the very low-carbon content of 0.01 per cent, was found to be completely free of hot-shortness, although it contained only a very small amount of manganese and silicon.—Page 1073.

Illuminate your plant adequately if you want to keep down the accident rate. Investigation reveals that poor lighting and a poor safety record go hand in hand.—Page 1079.

In 20 years Ford has scrapped less than 2 per cent of his machine tools. He now has 53,000 in service, having scrapped less than 1000.—Page 1081.

Hardness of quenched carbon steel is not because of internal strains set up by expansion taking place when gamma iron transforms to alpha iron, Dr. Jeffries declares. Cites experiment as evidence of the untenability of theory.—Page 1102.

Drills lathe beds without removing them from conveying cars. Lathe manufacturer cuts production cost by mounting a lathe bed on two flat cars and drilling while on the cars.—Page 1071.

Ford believes in grouping machines closely. Though seemingly little room is left for aisles and for the movement of workmen, it is apparent that close grouping makes for efficiency and speed of production.—Page 1082.

Make the public steel-minded. The steel industry has suffered from lack of publicity. Markets have been lost to other products which have been aggressively promoted. Discovery and development of new markets in most cases has been left almost entirely to consumers.—Page 1106.

You don't have to produce in great quantities to profit by adoption of quantity production methods, machine tool builder proves. Though lathe manufacturer's annual output is only 1000 units, he has secured important economies by availing himself of the shortcuts the giant plants use.—Page 1067.

Simple record system enables production department to control operations throughout plant, providing detailed information regarding costs, volume of work in process, and quantity of parts on hand. Assembly cost card is the "heart" of system in use in machine shop.—Page 1069.

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More Publicity for Steel

THIRTEEN years ago, at the two 1915 meetings of the American Iron and Steel Institute, men both within and without the industry spoke of the value to be gained from a well executed campaign informing the American public about steel. But in the commotion and distraction of sending munitions and machinery (and later men) to warring Europe, the project never got under way, despite the ease with which it then might have been financed.

At the spring meeting in that year Edward M. Hagar, formerly head of the Steel Corporation's cement subsidiary and at that time president of the Hagar Cement Co., told of the handsome return his industry had received from its continuing publicity. Among other things he said that the steel men could spend \$12,000,000 annually on promotional work before they would exceed the pro-rata expenditure of the cement men. Then he added significantly: "We manufacturers of cement have found by experience that we get back with interest all the money we spend in the educational campaign."

At the fall meeting of the institute in the same year George H. Jones, vice-president Inland Steel Co., returned to the subject. He made disparaging comparisons between his own industry on the one hand and the lumbermen, pineapple growers, and the manufacturers of composition roofing, as well as of tooth paste and chewing gum. He indicated several lines of approach whereby the great American consuming public could be encouraged to make greater use of steel, particularly sheets, shapes and wire products. Finally, at the banquet Ralph H. Sweetser, then president of Thomas Iron Co., gave the discussion a very practical turn by telling how in a well directed advertising campaign his company had been able to get a premium for so prosaic a thing as a certain brand of pig iron made in the Lehigh Valley.

In 1915, when Mr. Hagar made his proposal that the American Iron and Steel Institute and the cement manufacturers cooperate in a campaign

of publicity to promote their common interests, the steel industry was just emerging from one of the periodic famines. It was indulging in much talk about better selling methods and better promotion work. But the intervening years have rolled along and the situation is still in many respects what it was then. Many salesmen are still executing contracts rather than marketing steel. Most producers are letting their customers find out the new uses for steel and the comparative value of iron or substitutes for specific purposes.

For examples: Automobile body makers have discovered the adaptability of sheet steel, not only for body covering, but for the stiffening structure underneath. Furniture builders have developed the commercial and artistic possibilities of steel desks, beds, chairs and tables. The petroleum and chemical industries found that a costly but durable steel barrel is cheaper than the perishable wooden ones. And only a fortnight ago THE IRON AGE told of a new company which plans to apply mass production methods to the manufacture of sanitary fixtures from sheet steel, its potential market representing the use of 300,000 tons a year of enameled and stainless steel sheets.

Only such developments as these coming from without have enabled the sheet steel makers to absorb the punishment administered by promoters of copper and substitute products, who have had a field day at the expense of galvanized metal.

Certain sections of the steel industry have attempted recently to place their products in a favorable light in the public prints. But the statement holds true that the industry generally—and its various units large and small—is the loser because for 13 years it has postponed the use of well-considered publicity; such publicity as on the one hand would reach the ordinary citizen and tell him about steel and on the other hand would show the manufacturing consumer of steel why he would do well to use more of it.

Mr. Hagar's and Mr. Jones's preachments of 13 years ago may well be revived and acted upon. Whether undertaken through the American Iron

and Steel Institute or in their individual capacities, no more compelling or remunerative work lies before the steel producers of the country than that of making the American public steel minded. To that end our best wish for the industry is that it will not long delay making itself publicity minded.

Rubber Also Came Down

THE downfall of rubber, or rather the collapse of the British plan for restricting production in order to enhance the price of the commodity, excellently illustrates the futility of cartels; and likewise the absence of popular danger from concentrated production. Here was a cartel, practically speaking, that was not merely sanctioned by a government but was inspired and regulated by it. For a while it worked satisfactorily, but it stimulated outside production which eventually broke its back. This simple story is the whole.

A great corporation controlling 50 per cent or more of an output can never be greedy or exacting, for if it were it would invite new competition that would defeat its purpose. Nor can a 100 per cent cartel go any further; for it would contain its own seeds of dissolution, which would spring up in irresistible temptation to its own members. This has been written in the industrial history of the world ever since the Secretan syndicate in copper of 40 years ago, and no doubt we might go further back.

The only octopus that can have its own way is one that has a monopoly of an indispensable natural resource or a generic patent or something of those sorts; and even such will not have their own arbitrary way, even if they could, inasmuch as their intelligence teaches them that broad business at low price is better than strangulation by exorbitance.

Steel and Other Activity

THAT divergent views are entertained on the state of general trade at the present time compared with that of a year ago is not strange when one sees what contrasting showings the quantitative statistics make. With important or supposed important indexes we have these divergences: that in three weeks debits to individual accounts at banks have run 12 per cent higher than a year previous, while with a similar three-week comparison, and counting out coal which has had a decline for reasons of its own, freight car loadings are off 1.5 per cent; also that while portland cement shipments in March were 9 per cent under those of the preceding March, steel production is now running above that of one year ago. If this month's rate proves to be the same as that of last month there is a gain of 5 per cent over last April.

There have been no price changes such as would help to explain money transfers materially exceeding those of a year ago, when apparently the physical volume of trade is running substantially the same. As to steel, it may be noted that prices are enough lower than those of a year ago to make it doubtful whether the money transfer for steel has been running altogether as large as that of a year ago despite the excess in tonnage.

In all the general appraisals of the state of trade, allowance needs to be made for the human element. Repeatedly in the past few years it has been observable that actual results in any given period, when finally measured by volume or by profits, have often made a better showing than would be expected from the things men were saying during the period. It seems to have become quite a habit to be conservative or ultra conservative in appraising trade conditions, in contrast with the habit before the war, when it was usual to disseminate sunshine talk and speak of "confidence" as the main support of trade.

Also, we shall have in the next few months a great deal of talk about trade based on political considerations, and in consequence the business man wishing to mind his own affairs will have to be more circumspect than ever.

Low Accident Rate in Larger Plants

INCREASING accident rates definitely follow increasing hours of work, according to figures gathered by the United States Bureau of Mines. Analyzing the accident rates in coke oven plants, it is found that, where beehive ovens have daily schedules of eight hours per worker, the injuries for each million man-hours in 1926 were 42. This rate was increased to 68 for those plants having 9-hour shifts.

Similar figures for by-product ovens on 8-hour shifts showed 23 accidents in 1926 for each million man-hours. For 12-hour shifts the accident rate went up to 31. In both cases corresponding figures for 1925 showed proportionately greater accidents where the longer day was worked.

Decreasing accident rates seem to go also with the larger plants. Thus, in 1926 there were 260 accidents for each thousand 300-day workers in plants having less than 50 employees. This figure was more than cut in half in plants with 50 up to 200 employees, where the rate was 115. Plants having 200 or more employees cut this latter rate in half again, showing an average of only 49 accidents for each thousand 300-day employees.

Apparently the large plants, with greater facilities for coping with accident conditions, have benefited markedly from the use of safety engineers and the education of their workmen by the activities of these specialists.

Improved Fuel Utilization

PRODUCTION of coal has increased little in recent years while results obtained from fuel have increased greatly, the increase being due partly to large increased production of petroleum and natural gas and partly to improved methods of utilizing fuels. Notions vary widely as to the relative importance of these two influences, but computations can be made giving some definite intimations. Thus, comparing 1916, a year of great activity, with 1927, a year of reasonably full activity, it is found that there was an increase of 25 per cent in the heat units involved in the three fuels as produced. There was an increase of less than 2 per cent in coal production

in the same eleven years, while petroleum production tripled and natural gas production doubled approximately. Gas production has not been reported for 1927, but a safe estimate may be made.

Production in the two years has been as follows, bituminous and anthracite coal being in net tons, petroleum in barrels of 42 gallons and natural gas in thousands of cubic feet:

| | 1916 | 1927 |
|-----------------------|-------------|---------------|
| Bituminous coal | 502,519,682 | 519,762,000 |
| Anthracite | 87,578,493 | 80,650,000 |
| Petroleum | 300,767,158 | 903,800,000 |
| Natural gas | 753,170,253 | 1,400,000,000 |

Factors developed some time ago by the Bureau of Mines as to average heat involved are, in British thermal units, 13,100 per pound of bituminous coal, 13,600 per pound of anthracite, 6,000,000 per barrel of petroleum and 1075 per cubic foot of natural gas. Accordingly, the total heat units involved in 1916 production of fuels was approximately 18,140 trillion, this rising 25 per cent to 22,750 trillion for 1927. Bituminous coal gained 480, anthracite lost 180, petroleum gained 3620 and natural gas gained 690. Thus the great bulk of the increase in heat units in 11 years was furnished by petroleum. The service rendered by all fuels has greatly increased, as is now well understood, by reasons of various improvements in utilization.

The division of heat units in 1927 was approximately as follows:

| | Per Cent |
|-----------------------|----------|
| Bituminous coal | 59.9 |
| Anthracite | 9.7 |
| Petroleum | 23.8 |
| Natural gas | 6.6 |

Probably in the long run petroleum may be regarded as temporarily high, but natural gas promises to increase, in view of the large gains since 1922 and the several large pipe line projects now

under consideration, apparently with no doubt that the gas itself will be available.

World Steel Output Trends Upward

A SCRUTINY of steel production of ten countries in January shows that nine exceeded the average monthly rate of 1927. In only one, Great Britain, was there a decrease. The percentage changes in order, beginning with the country having the largest increase, were as follows:

| | |
|---------------------|-------|
| Russia | +14.3 |
| Canada | +11.4 |
| United States | +10.3 |
| France | + 8.9 |
| Germany | + 8.0 |
| Saar | + 6.8 |
| Luxemburg | + 3.6 |
| Belgium | + 2.0 |
| Poland | + 0.7 |
| Great Britain | -17.4 |

In the ten countries the net increase was 6.5 per cent, from 7,506,000 tons per month in 1927 to 7,994,000 tons in January. Outside the United States and Great Britain the increase was 7.8 per cent.

The United States has shown such a uniform seasonal swing in recent years that none of the early months of the year can be regarded as strictly typical of the year, March in particular being likely to be the high month. That is not the case with other countries. Last year March was the high month in Great Britain, the Saar and Poland alone. April was the high month in Canada, August in Germany and Belgium, and October in France and Luxemburg. Russia showed a steady increase during the year, with December the high month; while Italy, not included in the foregoing comparison, had January as the high month, with a steady decrease thereafter.

LAKE ORE PRICES NAMED

Schedule for 1928 Same as for Last Year—
Established by Large Sale to Ford

CLEVELAND, April 17.—Lake Superior iron ore prices that prevailed last year were established for 1928 by round lot sales made by leading ore firms April 16 to the Ford Motor Co. The Ford inquiry was for 445,000 tons and it is understood that approximately that amount was purchased. The bulk, if not all, of the Ford business went to two producers. On the same day a steel interest made an open market purchase of 100,000 tons, and today several additional open market sales were made. Last year's prices had been quoted on these inquiries several days ago, but the placing of the business was held up awaiting other sales to establish prices.

The Lake shipping season will start about May 1, and it is expected that the 1928 ore movement will be about the same as last year. However, several steel companies have under consideration schedules calling for more ore than they took in 1927.

It had been the belief of the ore trade for some time that the 1927 prices would prevail this year. These prices were established in 1925 and there has been no change since that time, so that this will be the fourth year without a change in the price schedule.

The reaffirmed prices for base grades of ore having 51.50 per cent iron, delivered lower Lake ports are per gross ton: Mesabi non-Bessemer, \$4.25; Old Range non-Bessemer, \$4.40; Mesabi Bessemer, \$4.40; Old Range Bessemer, \$4.55, and high phosphorus, \$4.15.

For several years ore producers have complained that ore prices were too low to yield a fair return to the mining companies and during at least one year many of the mines made no profit. This year there was virtually no talk of getting higher prices. However, the producers were able to reestablish the old prices in spite of a sharp decline in pig iron prices. When ore prices were named last year basic pig iron was quoted at \$19, Valley furnace, or \$2 a ton higher than at present, and No. 2 foundry iron was \$18.50, or \$1.25 a ton above the present price. When the present ore prices were first named in 1925 both basic and foundry pig iron were quoted at \$20.50, Valley furnace.

Passing upon a complaint of the Sinclair Wyoming Oil Co., the Interstate Commerce Commission in a recent decision ordered the carload rate on steel tank material from the Chicago district to Casper, Carey, Welch and Clayton, Wyo., reduced to 90c. from \$1 per 100-lb., with an 80,000-lb. minimum. The rate of \$1.24 from Pittsburgh was held to be reasonable. Reparation was awarded on the basis between the rates and higher rates which were assessed.

STEEL CORPORATION CHANGES

Lamont Elected to Directorate and Two New Vice-Presidents Appointed

Thomas W. Lamont, a partner in J. P. Morgan & Co., was elected a director of the United States Steel Corporation, to fill the vacancy on the board caused by the death of Elbert H. Gary, at the annual meeting of stockholders held at Hoboken, N. J., on April 16. George F. Baker, Eugene J. Buffington, James A. Farrell and J. Pierpont Morgan were reelected directors. Myron C. Taylor, recently elected chairman of the finance committee, presided at the meeting in the absence of J. P. Morgan, now chairman of the board, and President James A. Farrell and General Counsel Nathan L. Miller sat with him.

Changes in the corporation's by-laws were approved by the stockholders providing that the chairman of the board and the chairman of the finance committee shall not be executive officers but that the executive officers shall be under their control and that the president shall be the chief executive officer of the corporation. Another change in by-laws was voted increasing the membership of the finance committee from eight to nine.

It was also decided that future meetings of stockholders shall be held at the executive offices, 71 Broadway, New York, rather than at the corporate offices at Hoboken.

New Vice-Presidents Will Have Charge of Operations and Marketing

The Board of Directors of the United States Steel Corporation April 17 elected Thomas W. Lamont as an alternate member of the finance committee.

The board also appointed, effective June 1, two additional vice-presidents: I. Lamont Hughes, who now is a vice-president of the Carnegie Steel Co., and E. P. Thomas, who now is president of the United States Steel Products Co. Mr. Hughes and Mr. Thomas, under the direction of President Farrell, will have supervision over the operations of the subsidiary companies in the following capacities: Mr. Hughes in respect to manufacturing operations of subsidiaries engaged in the production of iron and steel, and Mr. Thomas in respect to the marketing of iron and steel products of the subsidiaries.

The board also ratified the appointment of two additional assistants to the president, W. A. Forbes and Harold L. Hughes.

RATES ON MILEAGE BASIS

Examiner for Interstate Commerce Commission Recommends Change in L. C. L. Charges in Eastern Territory

WASHINGTON, April 17.—Shipments of iron and steel products in less-than-carload lots will be greatly affected by changes in rates proposed if the report to the Interstate Commerce Commission by Examiner Howard Hosmer if the so-called Eastern class rate investigation is sustained. The Hosmer report recommends a distance or mileage scale of rates in substantially the same manner as that recently put into effect in the South. Iron and steel carload rates were not involved in the Eastern class rate investigation, but are being considered in a separate investigation involving all of Official Classification territory.

Iron and steel products in less than carloads are generally rated fourth class, although from Pittsburgh and Johnstown, Pa., to certain points in Pennsylvania, New York and West Virginia there are less-than-carload commodity rates. Youngstown manufacturers, who have no such commodity rates, have objected to this difference in treatment.

The first class rates proposed by Examiner Hosmer are about 73 per cent of those prescribed for the South. Between points in northwestern Illinois, Zone C in Michigan, Zone B in New England, certain branch lines of the New York Central in New York and certain branch lines in Virginia, West Virginia and Kentucky and other points in Official Classification territory, rates approximately 10 per cent higher than the basic level are proposed. To and from certain lines of the Chesapeake & Ohio and Norfolk & Western a still higher basis is proposed. Within Zone A in New England the proposed basis is 5 per cent higher, and within Zone B 15 per cent higher, than the basic level. No specific basis is proposed for short lines. Reasonable groupings, according to the report, would be authorized. The report recommends that standard rail-Lake rates to and from Chicago be made 85 per cent of the all-rail rates and rail-Lakes-rail rates by way of Chicago 90 per cent of the all-rail rates, but recommends no other findings as to water-rail rates.

It is suggested that the number of classes be increased from eight to 23, evidently, it is said, with the idea that many articles now moving on commodity rates will ultimately move on class rates. According to a statement issued by Wilbur LaRoe, Jr., counsel

for the Associated Industries of New York State and the Port of New York Authority, iron and steel producers along the Niagara frontier will be given the benefit of their relatively short distances to New England, "which will help them materially in their competition with Pittsburgh."

Bookings of Fabricated Structural Steel Continue High

WASHINGTON, April 17.—Orders for fabricated structural steel in March totaled 202,251 tons, or 69 per cent of the monthly capacity of the 193 reporting firms, with combined capacity of 292,160 tons, according to reports received by the Department of Commerce. This compares with February bookings of 212,068 tons, or 71 per cent of capacity of the 210 reporting firms, with aggregate capacity of 299,420 tons. Computed total bookings in March and February were 258,750 tons and 266,250 tons respectively. Shipments in March were computed at 236,250 tons, or 63 per cent of capacity, and were identical with those of February.

For the first quarter ended March 31 computed bookings were 735,000 tons, and represented 65 per cent of capacity, against 671,250 tons during the corresponding period of last year, when they represented 60 per cent of capacity. Shipments during the first quarter of the current year were computed at 682,500 tons, or 61 per cent of capacity, compared with 618,750 tons, or 55 per cent capacity, for the first quarter of 1927.

Greatly Increased Production of Steel Barrels in March

March production of steel barrels as reported by the Department of Commerce at 636,855, compared with 518,944 in February and 475,906 in January. The number manufactured in March is the greatest in more than two years. Shipments were even heavier, at 644,521—again the largest in more than two years. Stocks at the end of the month were 51,269.

Unfilled orders March 31 called for a total of 1,343,583 barrels, of which 304,043 were scheduled for delivery within 30 days. The higher rate of manufacture and shipments cut into the unfilled order volume, which declined about 75,000 during the month. The total is now lower than at the end of either February or January, but otherwise is the highest since July 31, 1927.

Iron and Steel Markets

Further Gain in Output at Chicago

Steel Production in Western District Now Over 95 Per Cent of Capacity—Operations Holding in Other Centers but with Backlogs Declining—Increased Weakness in Sheets

A SUSTAINED rate of steel production, following a record quarter, is a market feature, but more impressive still is a further increase in operations at Chicago. With specifications for finished steel running ahead of shipments, deliveries from Chicago mills are extending and ingot output has passed 95 per cent of capacity, with the blowing in of another steel works blast furnace an early possibility.

The average rate of plant operations in the remainder of the country is not that high, but it is holding its own. Reduced output in some finished products is largely offset by heavier production of others. However, in contrast with the situation at Chicago, shipments are heavier than bookings, and mill backlogs are being reduced. The decline in new business, of course, is not surprising at this juncture, since consumers and jobbers freely covered their requirements prior to the last price advances.

Whether the present pause in demand is merely temporary or presages a downturn in mill operations will depend on the flow of steel into consuming channels. Automobile output, although large, is no longer gaining. Makers of motor car parts have reduced their purchases of cold-finished bars, producers of which are now taking less hot-rolled steel. On the other hand, the Ford Motor Co. is steadily increasing its operations and is placing proportionately larger steel orders. Some mills serving the motor car industry are fully booked in automobile body sheets and hot-rolled strip steel until late in May.

Agricultural implement plants, which have been taking considerable steel, especially from Chicago mills, are planning a reduction in output as spring demand for their products tapers.

Railroad purchases of rails have been largely completed, but good mill operations are assured for the next six or eight weeks and a secondary buying movement of fair proportions is expected in May or June. Railroad orders for rolling stock are disappointingly small.

Construction activity is still unabated. Awards of structural steel for the week exceeded 35,000 tons, and lettings of concrete bars were particularly high, totaling nearly 17,000 tons. Better specifications for standard-weight pipe, doubtless stimulated by the recent price advance, have resulted in heavier production, notably in the Youngstown district.

Tin plate specifications for June shipment are large, reflecting a heavier stocking of cans by packers, and tin mills are maintaining operations at 90 per cent of capacity.

Mill prices, as a whole, still await a real test. Sheets, however, have shown further weakness,

although price concessions are reported mainly in the Central West. On blue annealed sheets 2c., Pittsburgh, a cut of \$2 a ton, has become a commoner quotation, while black sheets have been sold at 2.75c., Pittsburgh, or \$3 a ton below the last advance. Metal furniture sheets, weaker in sympathy with black sheets, have been sold at a reduction of \$2 a ton.

Sheet bookings, possibly because of the flexibility of prices, are holding up surprisingly well, although March sales by independent mills, at 399,441 net tons, were the largest, excepting last December, for any month since September, 1926.

Makers of wire nails are finding it difficult to book second quarter business at \$2.65 per keg, Pittsburgh or Cleveland, and some of them continue to accept specifications on first quarter contracts carrying a price 10c. per keg lower.

The 35,000 tons of structural steel awarded during the week included 6000 tons for a bridge approach at St. Louis, 5000 tons for subways in New York and 4400 tons for a New York hotel. About 40,000 tons was added to work under negotiation, the largest project a bridge in South Carolina calling for 12,000 tons.

Orders for fabricated steel in March are computed at 258,750 tons, compared with 266,250 tons in February. Computed bookings for the first quarter were 735,000 tons, representing 65 per cent of capacity, as against 671,250 tons, or 60 per cent of capacity, in the corresponding period last year.

The Southern Pacific Railroad has doubled its recent inquiry for 500 flat cars and 50 gondolas. The Chicago, Rock Island & Pacific is in the market for 500 box car underframes, and the St. Louis-San Francisco is inquiring for 250 car bodies. Several railroads are soon to buy a total of about 100 passenger cars.

A cargo of Lake Erie pig iron will arrive at Chicago about May 1, and some of it has been sold at prices 50c. or 75c. below the prevailing quotations by Chicago furnaces. In other centers pig iron prices are fairly steady. A steel foundry company has a quotation on basic pig iron equivalent to \$16 at Valley furnace, but makers of iron in the Valley are said not to have quoted on the business because of disadvantageous freight rates. The St. Louis market is fairly active, with sales of 11,000 tons, of which 5000 tons was to a radiator company.

Lake Superior iron ore prices of 1927 were re-established for this year by sales of 445,000 tons to the Ford Motor Co.

Both of THE IRON AGE composite prices remain at last week's levels, that for pig iron at \$17.67 a gross ton and that for finished steel at 2.362c. a lb. Finished steel is close to its position of one year ago, but pig iron is down more than \$1.50 a ton.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

| Pig Iron, Per Gross Ton: | Apr. 17, 1928 | Apr. 10, 1928 | Mar. 20, 1928 | Apr. 19, 1927 |
|-----------------------------|---------------|---------------|---------------|---------------|
| No. 2 fdy., Philadelphia... | \$20.76 | \$20.76 | \$20.76 | \$21.76 |
| No. 2, Valley furnace..... | 17.25 | 17.25 | 17.25 | 18.50 |
| No. 2, Southern, Cin'ti.... | 19.69 | 19.69 | 19.69 | 21.69 |
| No. 2, Birmingham..... | 16.00 | 16.00 | 16.00 | 18.00 |
| No. 2 foundry, Chicago*... | 18.50 | 18.50 | 18.50 | 20.00 |
| Basic, del'd eastern Pa... | 19.50 | 19.50 | 19.50 | 20.75 |
| Basic, Valley furnace..... | 17.00 | 17.00 | 17.00 | 19.00 |
| Valley Bessemer, del'd P'gh | 19.26 | 19.26 | 19.26 | 21.26 |
| Malleable, Chicago*..... | 18.50 | 18.50 | 18.50 | 20.00 |
| Malleable, Valley..... | 17.25 | 17.25 | 17.25 | 18.50 |
| Gray forge, Pittsburgh.... | 18.51 | 18.51 | 18.51 | 19.76 |
| L. S. charcoal, Chicago.... | 27.04 | 27.04 | 27.04 | 27.04 |
| Ferromanganese, furnace.. | 100.00 | 100.00 | 100.00 | 100.00 |

| Rails, Billets, etc., Per Gross Ton: | Apr. 17, 1928 | Apr. 10, 1928 | Mar. 20, 1928 | Apr. 19, 1927 |
|--------------------------------------|---------------|---------------|---------------|---------------|
| O.-h. rails, heavy, at mill.. | \$43.00 | \$43.00 | \$43.00 | \$43.00 |
| Light rails at mill..... | 36.00 | 36.00 | 36.00 | 36.00 |
| Bess. billets, Pittsburgh... | 33.00 | 33.00 | 33.00 | 33.00 |
| O.-h. billets, Pittsburgh... | 33.00 | 33.00 | 33.00 | 33.00 |
| O.-h. sheet bars, P'gh.... | 34.00 | 34.00 | 34.00 | 34.00 |
| Forging billets, P'gh..... | 38.00 | 38.00 | 38.00 | 40.00 |
| O.-h. billets, Phila..... | 38.30 | 38.30 | 38.30 | 39.30 |
| Wire rods, Pittsburgh..... | 44.00 | 44.00 | 44.00 | 42.00 |
| Skelp, grvd. steel, P'gh, lb. | 1.85 | 1.85 | 1.85 | 1.90 |

Finished Iron and Steel,

| Per Lb. to Large Buyers: | Cents | Cents | Cents | Cents |
|----------------------------|-------|-------|-------|-------|
| Iron bars, Philadelphia... | 2.12 | 2.12 | 2.12 | 2.12 |
| Iron bars, Chicago..... | 2.00 | 2.00 | 2.00 | 2.00 |
| Steel bars, Pittsburgh.... | 1.85 | 1.85 | 1.85 | 1.90 |
| Steel bars, Chicago..... | 2.00 | 2.00 | 2.00 | 2.00 |
| Steel bars, New York..... | 2.19 | 2.19 | 2.19 | 2.24 |
| Tank plates, Pittsburgh... | 1.85 | 1.85 | 1.85 | 1.85 |
| Tank plates, Chicago..... | 2.00 | 2.00 | 2.00 | 2.00 |
| Tank plates, New York... | 2.17½ | 2.17½ | 2.17½ | 2.19 |
| Beams, Pittsburgh..... | 1.85 | 1.85 | 1.85 | 1.90 |
| Beams, Chicago..... | 2.00 | 2.00 | 2.00 | 2.00 |
| Beams, New York..... | 2.14½ | 2.14½ | 2.14½ | 2.14 |
| Steel hoops, Pittsburgh... | 2.20 | 2.20 | 2.20 | 2.30 |

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

| Sheets, Nails and Wire, Per Lb. to Large Buyers: | Apr. 17, 1928 | Apr. 10, 1928 | Mar. 20, 1928 | Apr. 19, 1927 |
|--|---------------|---------------|---------------|---------------|
| Sheets, black, No. 24, P'gh | 2.80 | 2.80 | 2.90 | 2.75 |
| Sheets, black, No. 24, Chi- | | | | |
| cago dist. mill..... | 3.00 | 3.00 | 3.00 | 2.95 |
| Sheets, galv., No. 24, P'gh | 3.65 | 3.65 | 3.65 | 3.60 |
| Sheets, galv., No. 24, Chi- | | | | |
| cago dist. mill..... | 3.85 | 3.85 | 3.85 | 3.85 |
| Sheets, blue, 9 & 10, P'gh | 2.10 | 2.10 | 2.10 | 2.15 |
| Sheets, blue, 9 & 10, Chi- | | | | |
| cago dist. mill..... | 2.20 | 2.20 | 2.20 | 2.35 |
| Wire nails, Pittsburgh.... | 2.65 | 2.65 | 2.65 | 2.55 |
| Wire nails, Chicago dist. | | | | |
| mill..... | 2.70 | 2.70 | 2.70 | 2.60 |
| Plain wire, Pittsburgh.... | 2.50 | 2.50 | 2.50 | 2.40 |
| Plain wire, Chicago dist. | | | | |
| mill..... | 2.55 | 2.55 | 2.55 | 2.45 |
| Barbed wire, galv., P'gh.. | 3.35 | 3.35 | 3.35 | 3.25 |
| Barbed wire, galv., Chi- | | | | |
| cago dist. mill..... | 3.40 | 3.40 | 3.40 | 3.30 |
| Tin plate, 100 lb. box, P'gh | \$5.25 | \$5.25 | \$5.25 | \$5.50 |

Old Material, Per Gross Ton:

| | | | | |
|-----------------------------|---------|---------|---------|---------|
| Heavy melting steel, P'gh. | \$15.50 | \$15.50 | \$14.75 | \$16.50 |
| Heavy melting steel, Phila. | 13.50 | 13.50 | 13.50 | 14.50 |
| Heavy melting steel, Ch'go | 12.50 | 12.50 | 12.50 | 13.00 |
| Carwheels, Chicago..... | 13.50 | 13.50 | 14.00 | 14.75 |
| Carwheels, Philadelphia... | 15.50 | 15.50 | 15.50 | 16.00 |
| No. 1 cast, Pittsburgh.... | 14.50 | 14.50 | 14.50 | 16.00 |
| No. 1 cast, Philadelphia... | 16.00 | 16.00 | 16.00 | 17.00 |
| No. 1 cast, Ch'go (net ton) | 14.00 | 14.00 | 14.50 | 16.50 |
| No. 1 RR. wrot. Phila.... | 15.00 | 15.00 | 15.00 | 16.50 |
| No. 1 RR. wrot. Ch'go (net) | 11.50 | 11.00 | 11.00 | 12.25 |

Coke, Connellsville, Per Net Ton at Oven:

| | | | | |
|--------------------------|--------|--------|--------|--------|
| Furnace coke, prompt.... | \$2.60 | \$2.60 | \$2.60 | \$3.15 |
| Foundry coke, prompt.... | 3.75 | 3.75 | 3.75 | 4.00 |

Metals,

| Per Lb. to Large Buyers: | Cents | Cents | Cents | Cents |
|-------------------------------|--------|--------|-------|--------|
| Lake copper, New York... | 14.25 | 14.30 | 14.25 | 13.12½ |
| Electrolytic copper, refinery | 14.12½ | 14.12½ | 14.00 | 12.87½ |
| Zinc, St. Louis..... | 5.75 | 5.75 | 5.72½ | 6.37½ |
| Zinc, New York..... | 6.10 | 6.10 | 6.07½ | 6.72½ |
| Lead, St. Louis..... | 6.00 | 6.00 | 5.80 | 6.90 |
| Lead, New York..... | 6.10 | 6.10 | 6.00 | 7.15 |
| Tin (Straits), New York... | 52.75 | 52.00 | 52.00 | 68.62½ |
| Antimony (Asiatic), N. Y. | 10.25 | 9.62½ | 10.25 | 15.50 |

Pittsburgh

Steel Production Is Holding to March Rate But New Business Is Lighter

PITTSBURGH, April 17.—Steel ingot production still is holding up to the March rate in this and nearby districts, but a distinct decrease in the amount of new business creates the fear that the peak has been reached, unless the lull is merely the result of the fact that consumers are liquidating extremely heavy takings of the latter part of March and the fore part of this month. Sheet sales appear to be holding up well, which is partly explained by the fact that prices are easy on most finishes, and June specifications for tin plate are heavy, but in other finished products the report is uniformly that new business is lighter than it has been.

The question now is as to the maintenance of consumption. The best demand for steel recently has been from the motor car builders, but the shipment of steel for use in automobiles being from four to six weeks in advance of actual fabrication, the production for that use is probably at its peak now. There is such keen competition among low-priced cars, the quality of which has been improved to such an extent as to bring them into competition with the medium-priced cars, that makers of the latter have been forced to make plans for the new season earlier than usual. The between-series period usually means that car builders will take only such raw material as they have on order to avoid building too many of the old cars to compete with the new ones.

There is no tangible evidence yet of improvement

in the oil industry, which means so much to pipe manufacturers. Railroad rolling stock business is far from active in this area. Building construction still promises well, but the agricultural implement industry rarely operates as fully in the summer, its selling season, as in other times of the year.

Steel ingot production is still running at 80 to 85 per cent of capacity. The Carnegie Steel Co. has put on a blast furnace at its Clairton, Pa., works.

In the primary materials, interest still centers in heavy melting steel scrap, which continues to move up under dealer buying. There is no life to the pig iron market and the coal market is very dull.

Pig Iron.—The Pittsburgh-Valley pig iron market is purely retail in character. Large melters appear covered against their requirements for the next 30 to 60 days, and buying is entirely from the consumers who seldom buy ahead of their nearby requirements. Carload lot sales are the rule and these are not especially numerous, since the jobbing foundries in this area are operating at a low rate, while the steel foundries feel the lack of railroad buying and the sanitary ware and radiator companies are not as busy as they sometimes have been at this time of the year. The American Steel Foundries is reported to be in the market for 5000 tons of basic iron for its Alliance, Ohio, works and is said to have a quotation that figures back to about \$16, Valley furnace, but evidence is lacking that any Valley furnaces have had the inquiry or have quoted. It is believed that an Ohio furnace having a freight rate of 50c. a ton to Alliance has merely given away its freight rate advantage to have produced the quotation named. Valley furnaces still call the market \$17, furnace. At that price the demand is limited, however, to

the immediate Valley district, since basic iron cannot be sold in the Pittsburgh district at a price that figures back to more than \$16 at Valley furnaces because of offerings by Pittsburgh district steel companies. Recent prices on other grades of Valley iron also are holding.

Prices per gross ton, f.o.b. Valley furnace:

| | |
|-----------------------------------|---------|
| Basic | \$17.00 |
| Bessemer | 17.50 |
| Gray forge | 16.75 |
| No. 2 foundry | 17.25 |
| No. 3 foundry | 16.75 |
| Malleable | 17.25 |
| Low phosphorus, copper free | 27.00 |

Freight rate to the Pittsburgh or Cleveland district, \$1.76.

Ferroalloys.—Specifications against contracts for ferromanganese, ferrosilicon and spiegeleisen continue in good volume, but there is little new business.

Semi-Finished Steel.—Billets, slabs and sheet bars are moving well, in keeping with a fairly high rate of engagement of non-integrated tin plate, sheet and strip mill capacity. There is little or no open market activity in these forms, since leading consuming companies, as for some time past, are drawing against contracts or agreements that are flexible as to duration. Only occasional sales of wire rods are being made at the present mill schedule, because there were few users who did not take full advantage of the lower prices available late last year and in January. While second quarter contracts have been signed at the full price, mills generally are waiting for specifications.

Bars, Plates and Shapes.—Fresh demand for bars suffers from the fact that consumers and jobbers took out or ordered tonnages freely last month to escape the advance in prices, and shipments of most of the mills now are exceeding orders. There are fair-sized new orders for plates for river barges, and in structural lettings local shops lately have been doing rather well, the week's awards including 3500 tons for the extension of the strip mill building of the American Rolling Mill Co., Butler, Pa. There is no evidence that mills are doing less than 1.85c., base Pittsburgh, on these products, while the small lot price is 1.90c.

Rails and Track Supplies.—Railroads are specifying steadily for rails and track fastenings. New business does not amount to much. There is only a moderate call for light-section rails.

Wire Products.—Uncertainty still exists as to nail prices, because jobbers, as a result of heavy takings in the first quarter, have not found it necessary to buy many and thus provide a test of the price to which makers went Jan. 26, last. Difficulty has been encountered by some mills in getting signatures to second quarter contracts at \$2.65, base, per keg, because others have continued to accept specifications on first quarter contracts priced 10c. per keg lower. Specifications for wire products in general have been lighter in the past week than in the week before, reflecting the fact that buyers have exhausted first quarter contracts and are well enough stocked to wait a while before ordering against higher priced commitments.

Tubular Goods.—Standard-weight pipe is making a

good showing in point of shipments and mill operations, but there is still a lack of activity in oil country goods. Projected line pipe orders of size are slow in reaching the mills. Mechanical tubing, for which the automotive industry is an important outlet, stands out in an otherwise quiet tubing market.

Cold-Finished Steel Bars and Shafting.—Demands for screw stock bars are steady, but generally are for small lots. Detroit advices suggest that motor car production has reached the spring peak, and with several makers planning new models for earlier presentation than usual, parts makers are ordering in close accord with requirements. There are no intimations of less than 2.20c., base Pittsburgh.

Hot-Rolled Flats.—Makers have no complaint as to the volume of business, but are not satisfied with the prices they are getting; on large tonnage orders competition has been sharp, and the full quotations of 1.90c., 2.10c. and 2.20c., according to width, have been obtained only on small lot business.

Cold-Rolled Strips.—Large lot consumers still are drawing against old orders carrying 2.75c., base Pittsburgh, for lots of three tons or more, and such tonnage as is moving at higher prices is in small lots, which, while numerous, account for a relatively small part of the total.

Sheets.—Mill operations are holding at the recent rate, but seemingly business is sustained by willingness on the part of most makers to meet buyers' ideas on prices. In this immediate area—not a large sheet consuming territory—black sheets are holding well to the full quotation, but elsewhere concessions of \$1 to \$3 a ton are reported, 2.75c., base, being fairly common in Detroit and in some parts of the South. Metal furniture sheets have been sold on a black sheet base of 2.75c. Galvanized sheets are generally 3.65c., with higher prices more of an asking than a sales basis. Blue annealed sheets are well held. Automobile body sheets are 4c., base, and most makers have written down to that price business taken at higher figures.

Tin Plate.—Business reports still are favorable, and mill operations maintain the high rate attained a few weeks ago of 90 per cent or more of capacity. Specifications for June shipment are very heavy. Regardless of the outcome of the crops, packers are reflecting in their releases a desire to have an ample stock of tin plate for the opening of summer.

Bolts, Nuts and Rivets.—Orders have been light since the opening of the month, but this is looked upon as a natural sequence to the fact that buyers were liberal in their specifications toward the close of last month, notably for rivets, which went to higher prices on April 1.

Coke and Coal.—The market still is in the doldrums. A call for a strike issued by irregular union leaders for April 16 has failed to bring out miners employed in open shop operations. The possibility of business stimulation through demands for coal from the Lakes is at least temporarily suspended by the injunction recently granted by the Federal Court at Richmond

THE IRON AGE Composite Prices

Finished Steel

April 17, 1928, 2.362c. a Lb.

| | |
|-------------------------------|---------|
| One week ago | 2.362c. |
| One month ago | 2.364c. |
| One year ago | 2.367c. |
| 10-year pre-war average | 1.689c. |

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

| | High | | Low | |
|------|----------|----------|----------|---------|
| 1928 | 2.364c., | Feb. 14: | 2.314c., | Jan. 3 |
| 1927 | 2.453c., | Jan. 4: | 2.293c., | Oct. 25 |
| 1926 | 2.453c., | Jan. 5: | 2.403c., | May 18 |
| 1925 | 2.560c., | Jan. 6: | 2.396c., | Aug. 18 |
| 1924 | 2.789c., | Jan. 15: | 2.460c., | Oct. 14 |
| 1923 | 2.824c., | Apr. 24: | 2.446c., | Jan. 2 |

Pig Iron

April 17, 1928, \$17.67 a Gross Ton

| | |
|-------------------------------|---------|
| One week ago | \$17.67 |
| One month ago | 17.75 |
| One year ago | 19.21 |
| 10-year pre-war average | 15.72 |

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

| | High | | Low | |
|------|----------|----------|----------|---------|
| 1928 | \$17.75, | Feb. 14: | \$17.54, | Jan. 3 |
| 1927 | 19.71, | Jan. 4: | 17.54, | Nov. 1 |
| 1926 | 21.54, | Jan. 5: | 19.46, | July 13 |
| 1925 | 22.50, | Jan. 13: | 18.96, | July 7 |
| 1924 | 22.88, | Feb. 26: | 19.21, | Nov. 3 |
| 1923 | 30.86, | Mar. 20: | 20.77, | Nov. 20 |

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

| | Base Per Lb. |
|---------------------------------|------------------|
| F.o.b. Pittsburgh mill..... | 1.85c. to 1.90c. |
| F.o.b. Chicago | 2.00c. |
| Del'd Philadelphia | 2.17c. to 2.22c. |
| Del'd New York | 2.19c. to 2.24c. |
| Del'd Cleveland | 2.04c. to 2.09c. |
| F.o.b. Cleveland | 1.85c. |
| F.o.b. Lackawanna | 1.95c. |
| F.o.b. Birmingham | 2.05c. to 2.15c. |
| C.i.f. Pacific ports | 2.35c. |
| F.o.b. San Francisco mills..... | 2.35c. to 2.40c. |

Billet Steel Reinforcing

| | |
|------------------------------|------------------|
| F.o.b. Pittsburgh mills..... | 1.90c. to 2.00c. |
| F.o.b. Birmingham | 2.05c. to 2.15c. |

Rail Steel

| | |
|--|--------|
| F.o.b. mills east of Chicago district..... | 1.75c. |
| F.o.b. Chicago Heights mill..... | 1.85c. |

Iron

| | |
|--------------------------------------|--------|
| Common iron, f.o.b. Chicago..... | 2.00c. |
| Refined iron, f.o.b. P'gh mills..... | 2.75c. |
| Common iron, del'd Philadelphia..... | 2.12c. |
| Common iron, del'd New York..... | 2.14c. |

Tank Plates

| | Base Per Lb. |
|------------------------------|--------------------|
| F.o.b. Pittsburgh mills..... | 1.85c. to 1.90c. |
| F.o.b. Chicago | 2.00c. |
| F.o.b. Birmingham | 2.05c. to 2.15c. |
| Del'd Cleveland | 2.04c. to 2.09c. |
| Del'd Philadelphia | 2.10c. to 2.15c. |
| F.o.b. Coatesville | 2.00c. to 2.05c. |
| F.o.b. Sparrows Point..... | 2.00c. |
| F.o.b. Lackawanna | 1.95c. |
| Del'd New York..... | 2.17½c. to 2.22½c. |
| C.i.f. Pacific ports | 2.30c. |

Structural Shapes

| | Base Per Lb. |
|------------------------------|--------------------|
| F.o.b. Pittsburgh mills..... | 1.85c. to 1.90c. |
| F.o.b. Chicago | 2.00c. |
| F.o.b. Birmingham | 2.05c. to 2.15c. |
| F.o.b. Lackawanna | 1.95c. |
| F.o.b. Bethlehem | 2.00c. |
| Del'd Cleveland | 2.04c. to 2.09c. |
| Del'd Philadelphia | 2.12c. to 2.18c. |
| Del'd New York..... | 2.14½c. to 2.19½c. |
| C.i.f. Pacific ports | 2.35c. |

Hot-Rolled Flats (Hoops, Bands and Strips)

| | Base Per Lb. |
|--------------------------------------|------------------|
| Narrower than 3 in., P'gh..... | 2.20c. to 2.40c. |
| Wider than 3 in. to 6 in., P'gh..... | 2.10c. to 2.20c. |
| 6 in. and wider, P'gh..... | 1.90c. to 2.00c. |
| Narrower than 3 in., Chicago..... | 2.40c. to 2.50c. |
| From 3 to 6 in., Chicago..... | 2.20c. to 2.30c. |
| 6 in. and wider, Chicago..... | 2.00c. to 2.10c. |

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

| | Base Per Lb. |
|---|------------------|
| Bars, f.o.b. Pittsburgh mills..... | 2.20c. |
| Bars, f.o.b. Chicago..... | 2.20c. |
| Bars, Cleveland | 2.25c. |
| Shafting, ground, f.o.b. mill..... | 2.45c. to 2.90c. |
| Strips, under 12 in., 1 up to 3 tons, P'gh..... | 3.00c. to 3.15c. |
| Strips, under 12 in., 1 up to 3 tons, Cleveland | 3.00c. to 3.15c. |
| Strips, under 12 in., 1 up to 3 tons, del'd Chicago | 3.30c. to 3.45c. |
| Strips, under 12 in., 1 up to 3 tons, Worcester | 3.15c. to 3.30c. |

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

| | Base Per Keg |
|--------------------------|--------------|
| Wire nails | \$2.65 |
| Galvanized nails | 4.65 |
| Galvanized staples..... | 3.35 |
| Polished staples | 3.10 |
| Cement coated nails..... | 2.65 |

| | Base Per 100 Lb. |
|------------------------------------|------------------|
| Bright plain wire, No. 9 gage..... | \$2.50 |
| Annealed fence wire..... | 2.65 |
| Spring wire | 3.50 |
| Galv'd wire, No. 9..... | 3.10 |
| Barbed wire, galv'd..... | 3.35 |
| Barbed wire, painted..... | 3.10 |

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., (wire) mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

| | |
|------------------------------------|---------|
| F.o.b. Pittsburgh | \$65.00 |
| F.o.b. Cleveland | 65.00 |
| F.o.b. Anderson, Ind. | 66.00 |
| F.o.b. Chicago district mills..... | 67.00 |
| F.o.b. Duluth | 68.00 |
| F.o.b. Birmingham | 68.00 |

Sheets

Blue Annealed

| | Base Per Lb. |
|--|------------------|
| Nos. 9 and 10, f.o.b. P'gh—wider than 40 in. | 2.20c. |
| Nos. 9 and 10, f.o.b. P'gh—40 in. and narrower | 2.10c. |
| Nos. 9 and 10, f.o.b. Chicago dist. mill..... | 2.20c. to 2.30c. |
| Nos. 9 and 10, del'd Cleveland..... | 2.19c. |
| Nos. 9 and 10, del'd Philadelphia..... | 2.32c. to 2.52c. |
| Nos. 9 and 10, f.o.b. Birmingham..... | 2.25c. to 2.30c. |

Box Annealed, One Pass Cold Rolled

| | |
|--|------------------|
| No. 24, f.o.b. Pittsburgh..... | 2.75c. to 2.90c. |
| No. 24, f.o.b. Chicago dist. mill..... | 3.00c. |
| No. 24, del'd Cleveland..... | 2.94c. to 2.99c. |
| No. 24, del'd Philadelphia..... | 3.12c. to 3.22c. |
| No. 24, f.o.b. Birmingham..... | 3.05c. |

Metal Furniture Sheets

| | |
|---|------------------|
| No. 24, f.o.b. Pittsburgh, A grade..... | 3.90c. to 4.00c. |
| No. 24, f.o.b. Pittsburgh, B grade..... | 3.70c. to 3.80c. |

Galvanized

| | |
|--|------------------|
| No. 24, f.o.b. Pittsburgh..... | 3.65c. to 3.75c. |
| No. 24, f.o.b. Chicago dist. mill..... | 3.85c. |
| No. 24, del'd Cleveland..... | 3.74c. to 3.84c. |
| No. 24, del'd Philadelphia..... | 3.97c. to 4.07c. |
| No. 24, f.o.b. Birmingham..... | 3.90c. |

Tin Mill Black Plate

| | |
|--|------------------|
| No. 28, f.o.b. Pittsburgh..... | 2.90c. to 3.00c. |
| No. 28, f.o.b. Chicago dist. mill..... | 3.10c. |

Automobile Body Sheets

| | |
|--------------------------------|--------|
| No. 20, f.o.b. Pittsburgh..... | 4.00c. |
|--------------------------------|--------|

Long Ternes

| | |
|--|--------|
| No. 24, 8-lb. coating, f.o.b. mill primes..... | 4.10c. |
|--|--------|

Tin Plate

Per Base Box

| | |
|---|--------|
| Standard cokes, f.o.b. P'gh district mills..... | \$5.25 |
| Standard cokes, f.o.b. Gary..... | 5.35 |

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per package, 20 x 28 in.)

| | |
|----------------------------|-----------------------------|
| 8-lb. coating I.C. \$11.20 | 25-lb. coating I.C. \$16.70 |
| 15-lb. coating I.C. 14.00 | 30-lb. coating I.C. 17.75 |
| 20-lb. coating I.C. 15.30 | 40-lb. coating I.C. 19.85 |

Alloy Steel Bars

(F.o.b. maker's mill.)

| S.A.E. Series Numbers | Per 100 Lb. |
|--|-------------|
| 2000 (¼% Nickel)..... | \$2.90 |
| 2100 (1½% Nickel)..... | 3.20 |
| 2300 (3¼% Nickel)..... | 4.15 |
| 2500 (5% Nickel)..... | 4.90 |
| 3100 Nickel Chromium..... | 3.20 |
| 3200 Nickel Chromium..... | 3.65 |
| 3300 Nickel Chromium..... | 6.45 |
| 3430 Nickel Chromium..... | 5.85 |
| 4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)..... | 3.15 |
| 4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)..... | 3.35 |
| 4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)..... | 3.70 |
| 5100 Chromium Steel (0.60 to 0.90 Chrome)..... | 3.00 |
| 5100 Chromium Steel (0.80 to 1.10 Chrome)..... | 3.10 |
| 5100 Chromium Spring Steel..... | 2.85 |
| 6100 Chromium Vanadium Bars..... | 3.85 |
| 6100 Chromium Vanadium Spring Steel..... | 3.60 |
| 9250 Silicon Manganese Spring Steel..... | 2.90 |
| Chrome Nickel Vanadium..... | 4.15 |
| Carbon Vanadium | 3.60 |

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

| | |
|--|---------|
| Standard, f.o.b. mill..... | \$43.00 |
| Light (from billets), f.o.b. mill..... | 35.00 |
| Light (from rail steel), f.o.b. mill..... | 34.00 |
| Light (from billets), f.o.b. Ch'go mill..... | 36.00 |

Track Equipment

Base Per 100 Lb.

| | |
|---|----------------------|
| Spikes, ½ in. and larger..... | \$2.80 |
| Spikes, ½ in. and smaller..... | 2.80 |
| Spikes, boat and barge..... | 3.00 |
| Tie plates, steel..... | 2.15 |
| Angle bars | 2.75 |
| Track bolts, to steam railroads..... | \$3.80 to 4.90 |
| Track bolts, to jobbers, all sizes, per 100 count | 70 per cent off list |

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

| Steel | | Butt Weld | | Iron | |
|----------------|-------|-----------|--------------|-------|-------|
| Inches | Black | Galv. | Inches | Black | Galv. |
| 1½ | 45 | 19½ | ¾ to ¾..... | +11 | +39 |
| 1½ to ¾..... | 51 | 25½ | ¾ | 22 | 2 |
| ¾ | 56 | 42½ | ¾ | 28 | 11 |
| ¾ | 60 | 48½ | 1 to 1½..... | 30 | 13 |
| 1 to 3..... | 62 | 50½ | | | |
| 2 | 55 | 43½ | 2 | 23 | 1 |
| 2½ to 6..... | 59 | 47½ | 2½ | 26 | 11 |
| 7 and 8..... | 56 | 43½ | 3 to 6..... | 28 | 18 |
| 9 and 10..... | 54 | 41½ | 7 to 12..... | 26 | 11 |
| 11 and 12..... | 53 | 40½ | | | |

Lap Weld

| | | | | | |
|----------------|----|-----|--------------|----|----|
| 2 | 55 | 43½ | 2 | 23 | 1 |
| 2½ to 6..... | 59 | 47½ | 2½ | 26 | 11 |
| 7 and 8..... | 56 | 43½ | 3 to 6..... | 28 | 18 |
| 9 and 10..... | 54 | 41½ | 7 to 12..... | 26 | 11 |
| 11 and 12..... | 53 | 40½ | | | |

Butt Weld, extra strong, plain ends

| | | | | | |
|--------------|----|-----|--------------|-----|-----|
| 1½ | 41 | 24½ | ¾ to ¾..... | +19 | +54 |
| 1½ to ¾..... | 47 | 30½ | ¾ | 21 | 17 |
| ¾ | 53 | 42½ | ¾ | 28 | 12 |
| ¾ | 58 | 47½ | 1 to 1½..... | 30 | 14 |
| 1 to 1½..... | 60 | 49½ | | | |
| 2 to 3..... | 61 | 50½ | | | |

Lap Weld, extra strong, plain ends

| | | | | | |
|----------------|----|-----|--------------|----|----|
| 2 | 53 | 42½ | 2 | 23 | 9 |
| 2½ to 4..... | 57 | 46½ | 2½ | 29 | 15 |
| 4½ to 6..... | 56 | 45½ | 4½ to 6..... | 28 | 14 |
| 7 to 8..... | 52 | 39½ | 7 to 8..... | 21 | 15 |
| 9 and 10..... | 45 | 32½ | 9 to 12..... | 16 | 2 |
| 11 and 12..... | 44 | 31½ | | | |

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

| Lap Welded Steel | | Charcoal Iron | |
|------------------|-----|------------------|-----|
| 2 to 2½ in..... | 27 | 1½ in..... | +18 |
| 2½ to 3 in..... | 37 | 1½ to 1¾ in..... | +8 |
| 3 in..... | 40 | 2 to 2½ in..... | —2 |
| 3½ to 3¾ in..... | 42½ | 2½ to 3 in..... | —7 |
| 4 to 13 in..... | 46 | 3½ to 4½ in..... | —9 |

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

| Cold Drawn | | Hot Rolled | |
|------------------|----|---------------------|----|
| 1 in..... | 60 | 3 in..... | 45 |
| 1½ to 1½ in..... | 52 | 3½ to 3½ in..... | 47 |
| 1½ in..... | 36 | 4 in..... | 50 |
| 2 to 2½ in..... | 31 | 4½, 5 and 6 in..... | 45 |
| 2½ to 2½ in..... | 39 | | |

Less carloads, 4 points less. Add \$3 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

| | |
|-----------------------------------|----|
| Carbon, 0.10% to 0.30%, base..... | 55 |
| Carbon, 0.30% to 0.40%, base..... | 50 |

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

restraining the Interstate Commerce Commission from interfering with the plan of Southern roads to make a reduction of 20c. a ton on coal moving to the Lakes from Southern mines. There is almost no market for spot furnace coke from the blast furnaces, and the demand for other uses is limited. It is a buyers' market in that grade. Producers are also finding it hard to market spot foundry coke at quite as good prices as recently.

Old Material.—The scramble of dealers to cover short sales continues in heavy melting steel, and that grade has had a further advance within the week. Pressure of consumers for shipments against old orders has extended to the Youngstown district, where dealers have paid \$16.08 to \$16.15, delivered, for railroad steel, while as much as \$16.50 has been paid by dealers for delivery at Steubenville, Ohio. The higher price also has been done on a sale to a Pittsburgh district mill that will take nothing but No. 1 railroad steel or its equivalent in industrial scrap. The competition of Youngstown dealers has forced local dealers to go as high as \$15.75 for ordinary steel, but such material has been offered to the mills at \$15.50. Heavy melting steel is quotable from \$15.50 to \$16.50, compared with \$15.50 to \$16 a week ago. Other grades are at the prices of a week ago and are not showing much activity.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

| Basic Open-Hearth Furnace Grades: | |
|--------------------------------------|--------------------|
| Heavy melting steel | \$15.50 to \$16.50 |
| Scrap rails | 15.00 to 15.50 |
| Compressed sheet steel | 15.00 to 15.50 |
| Bundled sheets, sides and ends | 14.00 to 14.50 |
| Cast iron carwheels | 14.50 to 15.00 |
| Sheet bar crops, ordinary | 15.50 to 16.00 |
| Heavy breakable cast | 13.00 to 13.50 |
| No. 2 railroad wrought | 15.50 to 16.00 |
| Heavy steel axle turnings | 13.00 to 13.50 |
| Machine shop turnings | 10.50 |
| Acid Open-Hearth Furnace Grades: | |
| Railroad knuckles and couplers | 16.50 to 17.00 |
| Railroad coil and leaf springs | 16.50 to 17.00 |
| Rolled steel wheels | 16.50 to 17.00 |
| Low phosphorus billet and bloom ends | 18.50 to 19.00 |
| Low phosphorus, mill plate | 17.50 to 18.00 |
| Low phosphorus, light grade | 16.50 to 17.00 |
| Low phosphorus sheet bar crops | 17.50 to 18.00 |
| Heavy steel axle turnings | 13.00 to 13.50 |
| Electric Furnace Grades: | |
| Low phosphorus punchings | 16.50 to 17.00 |
| Heavy steel axle turnings | 13.00 to 13.50 |
| Blast Furnace Grades: | |
| Short shoveling steel turnings | 11.00 to 11.25 |
| Short mixed borings and turnings | 11.00 to 11.25 |
| Cast iron borings | 11.00 to 11.25 |
| No. 2 busheling | 10.50 to 11.00 |
| Rolling Mill Grades: | |
| Steel car axles | 18.00 to 19.00 |
| No. 1 railroad wrought | 11.00 to 11.50 |
| Sheet bar crops | 17.00 to 17.50 |
| Cupola Grades: | |
| No. 1 cast | 14.50 to 15.00 |
| Rails 3 ft. and under | 15.50 to 16.00 |
| Malleable Grades: | |
| Railroad | 15.50 to 16.00 |
| Industrial | 15.00 to 15.50 |
| Agricultural | 14.50 to 15.00 |

Warehouse Prices, f.o.b. Pittsburgh

| | Base per Lb. |
|--|----------------------|
| Plates | 3.00c. |
| Structural shapes | 3.00c. |
| Soft steel bars and small shapes | 2.90c. |
| Reinforcing steel bars | 2.75c. |
| Cold-finished and screw stock— | |
| Rounds and hexagons | 3.60c. |
| Squares and flats | 4.10c. |
| Bands | 3.60c. |
| Hoops | 4.00c. to 4.50c. |
| Black sheets (No. 24 gage), 25 or more bundles | 3.65c. |
| Galvanized sheets (No. 24 gage), 25 or more bundles | 4.50c. |
| Blue annealed sheets (No. 10 gage), 25 or more sheets | 3.10c. |
| Galvanized corrugated sheets (No. 28 gage), per square | \$4.39 |
| Spikes, large | 3.40c. |
| Small | 3.80c. to 5.25c. |
| Boat | 3.80c. |
| Track bolts, all sizes, per 100 count, | 60 per cent off list |
| Machine bolts, per 100 count, | 60 per cent off list |
| Carriage bolts, per 100 count, | 60 per cent off list |
| Nuts, all styles, per 100 count, | 60 per cent off list |
| Large rivets, base per 100 lb. | \$3.50 |
| Wire, black soft annealed, base per 100 lb. | \$3.00 to 3.10 |
| Wire, galvanized soft, base per 100 lb. | 3.00 to 3.10 |
| Common wire nails, per keg | 3.00 |
| Cement coated nails, per keg | 3.05 |

Building Construction Volume Continues High

Construction contracts to the amount of \$592,567,000 were awarded in March in the 37 States east of the Rocky Mountains, according to F. W. Dodge Corporation. This was the largest figure for any month since last June. It was, however, 5 per cent under the record of March, 1927. The total brings the aggregate for the first quarter to \$1,485,067,000. This is 6 per cent above the first quarter of last year and is the highest first quarter on record.

Residential buildings accounted for 46 per cent of the total, with \$275,192,000. Public works and utilities took \$110,339,000; commercial buildings, \$73,075,000; educational projects, \$33,881,000.

In the Central West, including the area from eastern Indiana and southern Michigan to western Nebraska and Oklahoma, the March total was the highest for that month ever recorded. It amounted to \$175,585,000. The Pittsburgh district, also, including western Pennsylvania, West Virginia, Ohio and Kentucky, showed a large gain in March, the total having been \$76,499,000. Other districts reported March totals above February, but they were under the figures for March, 1927.

Wholesale Prices Slightly Lower

Commodity prices in March are reported by the United States Bureau of Labor Statistics at 96, compared with an average of 100 as the base in 1926. This shows a drop from 96.4 in February, but an increase over the 94.5 registered in March, 1927. Nearly all of the major groups participated in the decline, the only exceptions being building materials, which remain the same at 91, and metals and metal products, which increased from 98.3 in February to 98.4 in March.

Metals have been relatively stable for a long period, having registered 98.2 a year ago. In their component parts, however, there has been considerable change. Thus, the iron and steel group has declined from 97.4 a year ago to 95.2 in March. Non-ferrous metals have declined from 95.1 to 90.4 in the same period. Agricultural implements dropped from 99.4 to 98.8, and miscellaneous metal products from 99.5 to 97.9. Meantime, automobiles have advanced from 99.8 to 104.3, this advance more than compensating for the decline in the other items.

Trends in Industry

Employment in March showed a gain of nearly 3 per cent over February, according to the monthly labor barometer of the National Metal Trades Association. The improvement has been steady since a low point was reached in December. The March figure was about 1/2 per cent below that of a year ago.

Construction volume in March is charted by the Associated General Contractors of America at a little higher level than in any recent preceding March. Using 100 as the 1913 base, March is given an index of 136, against 135 a year ago and 119 in 1926. The curves in 1926 and 1927 were similar, but with the latter higher in almost every month; 1928 has been ahead of the other two years, except in January.

Total imports of industrial machinery into Chile in 1926 were valued at 120,490,244 pesos, of which 87,530,131 pesos represented the value of shipments from the United States, according to a report received by the Industrial Machinery Division, Department of Commerce, from Assistant Commercial Attaché Robert G. Glover, Santiago.

On March 1 American shipyards were building, or had under contract to build, for private shipowners, 283 steel vessels of 179,502 gross tons, compared with 261 steel vessels of 184,945 tons on Feb. 1, according to the bureau of navigation, Department of Commerce.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

| | Per Gross Ton |
|---|------------------|
| Rerolling, 4-in. and over..... | \$33.00 |
| Rerolling, under 4-in. to and including 1½-in. | \$33.50 to 34.00 |
| Forging, ordinary | 38.00 to 39.00 |
| Forging, guaranteed | 43.00 to 44.00 |

Sheet Bars

| | Per Gross Ton |
|------------------------------|---------------|
| Open-hearth or Bessemer..... | \$34.00 |

Slabs

| | Per Gross Ton |
|--------------------------------|---------------|
| 8 in. x 2 in. and larger..... | \$33.00 |
| Smaller than 8 in. x 2 in..... | 34.00 |

Skelp

| | Per Lb. |
|-----------------|------------------|
| Grooved | 1.85c. to 1.90c. |
| Sheared | 1.85c. to 1.90c. |
| Universal | 1.85c. to 1.90c. |

Wire Rods

| | Per Gross Ton |
|-------------------------|--------------------------|
| *Common soft, base..... | \$44.00 |
| Screw stock | \$5.00 per ton over base |

*Chicago mill base is \$45. Cleveland mill base, \$44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

| | Per Gross Ton |
|---|------------------|
| Old range Bessemer, 51.50% iron..... | \$4.55 |
| Old range non-Bessemer, 51.50% iron..... | 4.40 |
| Mesabi Bessemer, 51.50% iron..... | 4.40 |
| Mesabi non-Bessemer, 51.50% iron..... | 4.25 |
| High phosphorus, 51.50% iron..... | 4.15 |
| Foreign Ore, c.i.f. Philadelphia or Baltimore | Per Unit |
| Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria..... | 10.00c. |
| Iron ore, Swedish, average 66% iron, | 9.25c. to 9.50c. |

| | |
|---|--------------------|
| Manganese ore, washed, 52% manganese, from the Caucasus..... | 39c. |
| Manganese ore, Brazilian, African or Indian, basis 50% | 38c. to 39c. |
| Tungsten ore, high grade, per unit, in 60% concentrates | \$10.50 to \$10.75 |

| | Per Gross Ton |
|--|--------------------|
| Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard | \$22.00 to \$24.00 |

| | Per Lb. |
|--|--------------|
| Molybdenum ore, 85% concentrates of MoS ₂ , delivered | 50c. to 55c. |

Coke

| | Per Net Ton |
|--|------------------|
| Furnace, f.o.b. Connellsville prompt | \$2.60 to \$2.75 |
| Foundry, f.o.b. Connellsville prompt | 3.75 to 4.50 |
| Foundry, by-product, Ch'go ovens..... | 9.00 |
| Foundry, by-product, New England, del'd | 11.00 |
| Foundry, by-product, Newark or Jersey City, delivered..... | 9.45 to 9.85 |
| Foundry, Birmingham | 5.00 |
| Foundry, by-product, St. Louis..... | 9.75 |

Coal

| | Per Net Ton |
|---|------------------|
| Mine run steam coal, f.o.b. W. Pa. mines | \$1.40 to \$1.80 |
| Mine run coking coal, f.o.b. W. Pa. mines | 1.50 to 1.75 |
| Gas coal, ¾-in., f.o.b. Pa. mines..... | 2.00 to 2.10 |
| Mine run gas coal, f.o.b. Pa. mines | 1.75 to 1.90 |
| Steam slack, f.o.b. W. Pa. mines..... | 1.10 to 1.15 |
| Gas slack, f.o.b. W. Pa. mines..... | 1.15 to 1.25 |

Ferromanganese

| | Per Gross Ton |
|--|---------------|
| Domestic, 80%, furnace or seab'd..... | \$100.00 |
| Foreign, 80%, Atlantic or Gulf port, duty paid | 100.00 |

Spiegeleisen

| | Per Gross Ton Furnace |
|---------------------------|-----------------------|
| Domestic, 19 to 21% | \$31.00 to \$32.00 |
| Domestic, 16 to 19% | 29.00 |

Electric Ferrosilicon

| | Per Gross Ton Delivered |
|-----------------|-------------------------|
| 50% | \$83.50 to \$88.50 |
| 75% | 130.00 to 140.00 |
| | Per Gross Ton Furnace |
| 10% | \$35.00 |
| 11% | 37.00 |
| | Per Gross Ton Furnace |
| 12% | \$39.00 |
| 14 to 16% | 45.00 |

Bessemer Ferrosilicon

| F.o.b. Jackson County, Ohio, Furnace | | | |
|--------------------------------------|--------------|---------------|--------------|
| Per Gross Ton | | Per Gross Ton | |
| 10 % |\$30.00 | 12 % |\$34.00 |
| 11 % |32.00 | | |

Silvery Iron

| F.o.b. Jackson County, Ohio, Furnace | | | |
|--------------------------------------|--------------|---------------|--------------|
| Per Gross Ton | | Per Gross Ton | |
| 6% |\$23.00 | 10% |\$28.00 |
| 7% |24.00 | 11% |30.00 |
| 8% |25.00 | 12% |32.00 |
| 9% |26.00 | | |

Other Ferroalloys

| | |
|--|------------------|
| Ferrotungsten, per lb. contained metal, del'd | 92c. to 95c. |
| Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads..... | \$11.00c. |
| Ferrovandium, per lb. contained vanadium, f.o.b. furnace | \$3.15 to \$3.65 |
| Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads..... | \$200.00 |
| Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton..... | \$91.00 |
| Ferrophosphorus, electric, 24%, f.o.b. An-niston, Ala., per gross ton..... | \$122.50 |

Fluxes and Refractories

Fluorspar

| | Per Net Ton |
|---|--------------------|
| Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines..... | \$15.00 to \$16.00 |
| No. 2 lump, Illinois and Kentucky mines..... | \$20.00 |
| Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid..... | \$16.00 |
| Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines..... | \$32.50 |

Fire Clay

| | Per 1000 f.o.b. Works | |
|------------------------------------|-----------------------|--------------------|
| | First Quality | Second Quality |
| Pennsylvania ... | \$43.00 to \$46.00 | \$35.00 to \$38.00 |
| Maryland | 43.00 to 46.00 | 35.00 to 38.00 |
| New Jersey | 50.00 to 65.00 | ———— |
| Ohio | 43.00 to 46.00 | 35.00 to 38.00 |
| Kentucky | 43.00 to 46.00 | 35.00 to 38.00 |
| Missouri | 43.00 to 46.00 | 35.00 to 38.00 |
| Illinois | 43.00 to 46.00 | 35.00 to 38.00 |
| Ground fire clay, per ton | 7.00 | |

Silica Brick

| | Per 1000 f.o.b. Works |
|---------------------------|-----------------------|
| Pennsylvania | \$43.00 |
| Chicago | 52.00 |
| Birmingham | 50.00 |
| Silica clay, per ton..... | \$8.50 to 10.00 |

Magnesite Brick

| | Per Net Ton |
|---|-------------|
| Standard sizes, f.o.b. Baltimore and Chester, Pa. | \$65.00 |
| Grain magnesite, f.o.b. Baltimore and Chester, Pa. | 40.00 |

Chrome Brick

| | Per Net Ton |
|---------------------|-------------|
| Standard size | \$45.00 |

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

| | Per Cent Off List |
|--|-----------------------------------|
| †Machine bolts | 70 |
| †Carriage bolts | 70 |
| Lag bolts | 70 |
| Plow bolts, Nos. 1, 2, 3 and 7 heads..... | 70 |
| Hot-pressed nuts, blank or tapped, square..... | 70 |
| Hot-pressed nuts, blank or tapped, hexagons..... | 70 |
| C.p.c. and t. square or hex. nuts, blank or tapped | 70 |
| Washers* | 6.75c. to 6.50c. per lb. off list |

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ½ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

| | |
|--|----------------------|
| Semi-finished hexagon nuts..... | 70 |
| Semi-finished hexagon castellated nuts, S.A.E..... | 70 |
| Stove bolts in packages, Pittsburgh..... | 80, 10 and 2½ |
| Stove bolts in packages, Chicago..... | 75, 20, 10 and 5 |
| Stove bolts in bulk, Pittsburgh..... | 80, 10 and 5 |
| Stove bolts in bulk, Chicago..... | 75, 20, 10, 5 and 2½ |
| Tire bolts | 60, 5 and 5 |

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

| | Base per 100 Lb. |
|-------------------------------------|------------------|
| F.o.b. Pittsburgh or Cleveland..... | \$2.90 |
| F.o.b. Chicago | 3.00 |

Small Rivets

(¼-In. and Smaller)

| | Per Cent Off List |
|-------------------------|-------------------|
| F.o.b. Pittsburgh | 70 and 10 to 70 |
| F.o.b. Cleveland | 70 and 10 to 70 |
| F.o.b. Chicago | 70 and 10 to 70 |

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

| | Per Cent Off List |
|--|-------------------|
| Milled cap screws..... | 80, 10 and 10 |
| Milled standard set screws, case hardened, | 80 and 10 |
| Milled headless set screws, cut thread..... | 80 |
| Upset hex. head cap screws, U.S.S. thread, | 85 and 5 |
| Upset hex. cap screws, S.A.E. thread..... | 85 and 5 |
| Upset set screws..... | 80, 10 and 10 |
| Milled studs | 70 and 5 |

Chicago

Steel Specifications Exceed Shipments— Automobile Demands Heavy

CHICAGO, April 17.—A feature of this market is that the demand for plates, shapes and bars is well balanced and producers are enjoying the most favorable rolling schedules in a year. Specifications for finished steel exceed shipments, thus delaying deliveries and bringing to the fore the probability that another steel mill blast furnace may be lighted at an early date. Ingot output for the district now stands well above 95 per cent.

Railroad inquiries include 96 passenger cars for three roads, 250 car bodies for a Southwestern road and 500 freight car underframes for the Rock Island. Steel tonnage taken by automobile manufacturers was large in March, but several automobile plants did not swing into heavy production until that month was well along, and at the current rate of specifying steel consumption by that industry in April gives promise of exceeding that of March. The agricultural implement trade is finding a steady use for rolling mill products, but with the spring demand for farm machinery rapidly nearing an end it is not improbable that production schedules will be revised downward by the end of this month.

An encouraging note in the business situation here is that employment in metalworking industries is gaining. March figures now available show an increase of 5 per cent in the number of workers in iron and steel plants.

Pig Iron.—With 95 per cent of second quarter iron sold, buyers in this market are turning their attention to their needs in third quarter. Sales are smaller than a week ago, but a number of large inquiries are taking shape. Local producers are holding to \$18.50 a ton and a strong effort is being made to maintain full differentials. A disturbing influence, however, is the fact that a cargo of Lake Erie iron will arrive here about May 1. Some of this has been sold at the full Chicago market prices, but the bulk of it carries prices from 50c. to 75c. a ton lower. Prices for silvery iron are weak and shading is not uncommon.

Prices per gross ton at Chicago:

| | |
|--|------------------|
| Northern No. 2 foundry, sil. 1.75 to 2.25 | \$18.50 |
| N'th'n No. 1 fdy., sil. 2.25 to 2.75 | 19.00 |
| Malleable, not over 2.25 sil. | 18.50 |
| High phosphorus | 18.50 |
| Lake Superior charcoal, averaging sil. 1.50 | 27.04 |
| Southern No. 2 fdy. (all rail).... | 22.01 |
| Southern No. 2 (barge and rail) .. | 21.18 |
| Low phos., sil. 1 to 2 per cent, copper free | \$28.50 to 29.00 |
| Silvery, sil. 8 per cent. | 29.79 |
| Bessemer ferrosilicon, 14 to 15 per cent | 46.79 |

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Specifications for ferrosilicon are heavy, as steel mills continue to produce close to capacity. Small lots of ferromanganese are being taken at \$100, seaboard. Spiegeleisen is quiet, and prices quoted are \$31 to \$32, Hazard, Pa., for the 19 to 21 per cent grade.

Prices delivered Chicago: 80 per cent ferromanganese, \$107.56; 50 per cent ferrosilicon, \$83.50 to \$87.50; spiegeleisen, 19 to 21 per cent, \$38.76 to \$39.76.

Bolts, Nuts and Rivets.—Specifications are steady but the outlook is not encouraging for the reason that farm implement manufacturers are planning an early reduction in output in accordance with a smaller sales volume, as the spring demand for machinery of this kind tapers. Fully 95 per cent of bolt, nut and rivet contracts submitted to buyers have been signed.

Coke.—Shipments of by-product foundry coke are steady and prices are firm.

Plates.—Interest is revived in several gas pipe lines that had previously come to the attention of the trade.

It is reported that financial matters have been arranged for a pipe line from the Southwest fields to Kansas City, Mo. The project that was to extend to Omaha, Neb., is still alive. Two lots of 1000 tons each of tankage materials have been purchased. Fresh inquiry from the oil fields is lacking, but it has been the experience that new business for oil companies develops rapidly and does not often stay long on the pending list. Car shops are apparently holding in check some of the work that is now on their books; this is shown by the tardiness with which specifications are being entered at mills for steel that will be needed for several recent car orders. Railroad equipment orders for the week include 50 caboose car underframes for the Northern Pacific. Among fresh inquiries are 500 flat and 50 gondola cars for the Southern Pacific, these being in addition to a similar request for prices issued several weeks ago; also 50 passenger cars for two Eastern railroads with terminals at Chicago and 250 car bodies for the St. Louis-San Francisco. Chicago district plate mills are well engaged and prices in and near Chicago are steady at 2c.

Mill prices on plates per lb.: 2.00c., base Chicago.

Structural Material.—The outlook in the structural field is encouraging. For a few weeks fresh inquiry dropped considerably behind the present rate of shop operations as the result of a scramble to award tonnages ahead of recent advances in steel prices. The effects of this move appear to be wearing off, and once more fabricators are busily engaged in estimating a large number and a wide variety of projects. Notable among fresh inquiry is a highway bridge, requiring 2100 tons, at St. Joseph, Mo., and 1700 tons for a bridge for the Baltimore & Ohio Railroad in Chicago. Outstanding among awards is 3100 tons for wharf sheds at New Orleans and 1400 tons for a steel mill building at Kansas City, Mo. Although shops in this district are well engaged, there is still an urge to cut prices, possibly because of the uncertainty of the volume of business which may be expected in the future and not because of a lack of orders on books or of tonnage that may be reasonably expected to come to fabricators over the next five or six weeks. Prices for structural material are steady at 2c. in practically all parts of this territory, except along the eastern border, where 1.95c., Chicago, is being done occasionally to meet competition from mines east of here.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Bars.—Specifications for mild steel bars continue to run ahead of shipments, and delivery dates have extended to well beyond four weeks and in some sizes to six weeks. Meanwhile, new buying, which is usually for 6 to 12 weeks' requirements, is fully equal to production. A feature of the market for this commodity is that the demand is widespread and orders on mill books are more diversified as to classification of consumers than at any recent time. Builders of road machinery are unusually busy and forgers are taking large quantities of soft steel bars. Prices on this grade are steady at 2c., Chicago. Alloy bar mills in this district are fully engaged, and in this commodity as in soft steel bars there is an ever widening circle of users. Prices at the new base and differentials are steady. Chicago mills are quoting 2c. on iron bars. No improvement in demand is noted. Backlogs in hard steel bars are slowly expanding. Specifications are in excess of production and deliveries are gradually extending, now being about two weeks on certain sizes. Mill output is being diverted to the general manufacturing trade, as stocks of fence post material and hard steel reinforcing bars are ample to meet immediate demands. Prices are steady at 1.85c., Chicago Heights.

Mill prices per lb.: Soft steel bars, 2.00c. base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Wire Products.—Muddy roads are still a market factor in several of the States west of the Mississippi River. This situation, however, is partly offset by a larger volume of business from the Northwest and a steady flow of orders from the South and the Central States east of the Mississippi Valley. Mill orders for nails are more numerous, which is not only a reflection

of greater consumer demand, but also an indication that stocks in the hands of distributors are being reduced. New buying is at close range and approximately equal to shipments, which represent 70 per cent of wire mill capacity. The reduction in producers' stocks has been checked, and a portion of output is being used to round out and in some instances to expand stocks at mills. Specifications from the manufacturing trade are steady. Prices for wire and wire products are given on page 1113.

Rails and Track Supplies.—New business in standard-section rails is quiet. This is of little concern to local producers for the reason that mill schedules are well arranged for the next six to eight weeks. Furthermore, the secondary tonnage that already has been added to books has come earlier than usual and producers are expecting a fair buying movement in May and June. Several carloads of light rails have been purchased. Miscellaneous orders for track accessories total over 14,000 tons, and inquiry is for not less than 5000 tons. Operations in all track supply departments are steady and output is running a trifle ahead of the rate a year ago.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Sheets.—Producers of this commodity are still working under the handicap of small orders and badly unbalanced books that do not afford schedules more than a week in advance. The Milwaukee hot mills were down most of last week, but have been producing since the first of this week. Output ranges from 70 to 75 per cent, which is a drop of 5 to 10 points in the last 10 days. The jobbing trade is quiet. Users of light gages are showing little interest in the market. Prices in and near Chicago are steady, but concessions are more common in nearly all outlying territory.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Cast Iron Pipe.—This market in and near Chicago is quiet. To the east and at Milwaukee several sizable public lettings are soon to be made. Detroit opens bids April 20 on 6000 tons of 36-in., 1000 tons of 30-in. and 5000 tons of 24-in. class C pipe. Royal Oak, Mich., will buy 500 tons of 6 and 8-in. pipe on April 23, and St. Clair Shores, Mich., will open bids May 1 on 19 miles of 6 and 8-in. pipe. Milwaukee will receive tenders on 2800 tons of 24 and 48-in. plain pipe and 180 tons of lugged pipe. Chicago is in need of 200 tons of special fittings in sizes from 16 to 54-in. Prices are steady at \$29 to \$31, Birmingham, for diameters 6-in. and larger.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, \$36.20 to \$39.20; 4-in., \$40.20 to \$43.20; Class A and gas pipe, \$4 extra.

Reinforcing Bars.—Rail steel bar tonnages hold the center of interest in this market. Awards of Illinois State roadwork, all of which take this commodity, are

numerous. Mills selling rail steel reinforcing bars direct are obtaining 1.85c. to 1.90c. on the ordinary run of work and 1.95c. on steel for bridges and culverts. The contract for the Chicago Daily News Building, calling for 1000 tons, is still open, but may be closed at any time. The Stickney, Ill., sewer project, 5000 tons, is active. Notable among fresh inquiries is 400 tons for a building for the Nu-Art Engraving Co., Chicago. Chicago warehouse prices for new billet reinforcing bars show some variation, with the minimum at 2.20c. a lb. Recent awards and new projects are shown on page 1128.

Old Material.—Whatever strength exists in this market is largely because of tightening of inspections and difficulty in getting scrap to meet the requirements of certain large users. Consumer purchases are small in the aggregate, but when sales are made it develops that prices are more stable than a week ago. Shipments against old contracts for heavy melting steel are large. New buying in this grade is of moderate size and confined to deliveries that are to be made to Gary mills. Stocks in the hands of buyers have been accumulating and, except in low phosphorus grades, there is little urge for melters to take the offerings of sellers. A check on the inflow of country scrap is following numerous rejections of material coming from rural districts. The Rock Island will sell 7200 tons of scrap material.

Prices delivered consumers' yards, Chicago:
Per Gross Ton

| Basic Open-Hearth Grades: | |
|---|--------------------|
| Heavy melting steel | \$12.50 to \$13.00 |
| Shoveling steel | 12.50 to 13.00 |
| Frogs, switches and guards, cut apart, and miscellaneous rails. | 13.00 to 13.50 |
| Hydraulic compressed sheets..... | 11.00 to 11.50 |
| Drop forge flashings..... | 9.50 to 10.00 |
| Forged, cast and rolled steel car-wheels..... | 14.75 to 15.25 |
| Railroad tires, charging box size | 16.00 to 16.50 |
| Railroad leaf springs, cut apart.. | 16.00 to 16.50 |
| Acid Open-Hearth Grades: | |
| Steel couplers and knuckles..... | 14.00 to 14.50 |
| Coil springs | 16.25 to 16.75 |
| Electric Furnace Grades: | |
| Axle turnings | 12.75 to 13.25 |
| Low phosphorus punchings..... | 14.00 to 14.50 |
| Low phosphorus plate, 12 in. and under | 13.75 to 14.25 |
| Blast Furnace Grades: | |
| Axle turnings | 10.00 to 10.50 |
| Cast iron borings | 9.25 to 9.75 |
| Short shoveling turnings..... | 9.25 to 9.75 |
| Machine shop turnings..... | 7.00 to 7.50 |
| Rolling Mill Grades: | |
| Iron rails | 14.00 to 14.50 |
| Rerolling rails | 13.75 to 14.25 |
| Cupola Grades: | |
| Steel rails less than 3 ft..... | 15.00 to 15.50 |
| Angle bars, steel | 13.75 to 14.25 |
| Cast iron carwheels | 13.50 to 14.00 |
| Malleable Grades: | |
| Railroad | 12.75 to 13.25 |
| Agricultural | 12.99 to 12.50 |
| Miscellaneous: | |
| *Relaying rails, 56 to 60 lb..... | 23.00 to 25.00 |
| *Relaying rails, 65 lb. and heavier | 26.00 to 27.00 |

Per Net Ton

| Rolling Mill Grades: | |
|----------------------------------|----------------|
| Iron angles and splice bars..... | 13.75 to 14.25 |
| Iron arch bars and transoms.... | 18.75 to 19.25 |
| Iron car axles | 21.50 to 22.00 |
| Steel car axles | 15.75 to 16.25 |
| No. 1 railroad wrought | 11.50 to 12.00 |
| No. 2 railroad wrought | 11.25 to 11.75 |
| No. 1 busheling | 10.00 to 10.50 |
| No. 2 busheling | 5.75 to 6.25 |
| Locomotive tires, smooth | 12.50 to 13.00 |
| Pipes and flues | 8.00 to 8.50 |
| Cupola Grades: | |
| No. 1 machinery cast..... | 14.00 to 14.50 |
| No. 1 railroad cast..... | 12.50 to 13.00 |
| No. 1 agricultural cast..... | 12.50 to 13.00 |
| Stove plate | 11.25 to 11.75 |
| Grate bars | 11.00 to 11.50 |
| Brake shoes | 11.00 to 11.50 |

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

Base per Lb.

| | |
|--|------------------|
| Plates and structural shapes..... | 3.10c. |
| Soft steel bars | 3.00c. |
| Reinforcing bars, billet steel..... | 2.20c. to 2.55c. |
| Cold-finished steel bars and shafting— | |
| Rounds and hexagons..... | 3.60c. |
| Flats and squares..... | 4.10c. |
| Bands | 3.65c. |
| Hoops | 4.15c. |
| Black sheets (No. 24)..... | 3.95c. |
| Galvanized sheets (No. 24)..... | 4.80c. |
| Blue annealed sheets (No. 10)..... | 3.50c. |
| Spikes, standard railroad..... | 3.55c. |
| Track bolts | 4.55c. |
| Rivets, structural | 3.60c. |
| Rivets, boiler | 3.60c. |

Per Cent Off List

| | |
|---|--------|
| Machine bolts | 60 |
| Carriage bolts | 60 |
| Coach or lag screws | 60 |
| Hot-pressed nuts, squares, tapped or blank.. | 60 |
| Hot-pressed nuts, hexagons, tapped or blank.. | 60 |
| No. 8 black annealed wire, per 100 lb..... | \$3.20 |
| Common wire nails, base per keg..... | 3.00 |
| Cement coated nails, base per keg..... | 2.90 |

The New York office of the Standard Seamless Tube Co., Pittsburgh, has been consolidated with that of Spang Chalfant & Co., Inc., at 51 East Forty-second Street.

The Marks-Fiske-Zeiger Co., 126 South Artillery Avenue, Detroit, dealer in iron and steel products, has changed its name to the Federal Steel Corporation.

Philadelphia

Steel Shipments Fair—Pig Iron Continues Quiet but Firm

PHILADELPHIA, April 16.—Except for a fair volume of shipments on contracts, business is decidedly limited both in steel and pig iron. Consumers are evidently operating sufficiently well to use the tonnage for which they have contracted, but require little or nothing in addition. On the small lots of new steel business in the market, 1.90c., Pittsburgh, on bars and 2.05c., Coatesville, on plates are being obtained, while shapes bring 2.05c., Bethlehem, only on the smaller purchases, usually less than carload lots.

Blue annealed, black and galvanized sheet prices continue unsettled. There is apparently a range of about \$2 a ton in quotations on these finishes.

Competition for fabricated steel projects is keen, but only a small tonnage of new business is reported in the market. The New York Central Railroad has awarded 10 steel barges to two builders and the Pennsylvania Railroad has 10 barges, floats and a tugboat hull still pending. About 300 tons of steel piling for a bridge at Allentown, Pa., went to the Bethlehem Steel Co.

Pig Iron.—Sales of pig iron consist mainly of carload lots to foundries. Eastern Pennsylvania furnaces are maintaining \$20, base, on foundry grades. The Panama Canal Commission, Washington, is about to close on 100 tons of No. 2 plain. Eastern Pennsylvania producers of low phosphorus iron have sold a few carloads to western Pennsylvania consumers. Small tonnages of Indian and Dutch iron continue to appear on the market at about \$20.25 per ton, duty paid.

Prices per gross ton at Philadelphia:

| | |
|--|------------------|
| East. Pa. No. 2 plain, 1.75 to 2.25 sil. | \$20.76 |
| East. Pa. No. 2X, 2.25 to 2.75 sil. | 21.26 |
| East. Pa. No. IX. | 21.76 |
| Basic (delivered eastern Pa.) | \$19.50 to 20.00 |
| Gray forge | 19.75 to 20.25 |
| Malleable | 21.00 to 21.50 |
| Standard low phos. (f.o.b. New York State furnace) | 23.00 to 24.00 |
| Copper bearing low phos. (f.o.b. furnace) | 23.50 to 24.00 |
| Virginia No. 2 plain, 1.75 to 2.25 sil. | 24.54 to 25.04 |
| Virginia No. 2X, 2.25 to 2.75 sil. | 25.04 to 25.54 |

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Billets.—Prices are unchanged at \$33 per ton, Pittsburgh, for rerolling billets and \$38 per ton, Pittsburgh, for forging quality.

Bars.—There is a moderate demand for bars, but purchases are confined to small lots and specifications against contracts. On small tonnages of new business, 1.90c. per lb., Pittsburgh, or 2.22c., delivered Philadelphia.

Warehouse Prices, f.o.b. Philadelphia

| | Base per Lb. |
|--|------------------|
| Plates, 1/4-in. and heavier | 2.50c. to 2.60c. |
| Plates, 3/8-in. | 2.80c. to 3.00c. |
| Structural shapes | 2.40c. to 2.60c. |
| Soft steel bars, small shapes and iron bars (except bands) | 2.50c. |
| Round-edge iron | 3.50c. |
| Round-edge steel, iron finished | 3.50c. |
| 1 1/2 x 1 1/2 in. | 4.30c. |
| Round-edge steel, planished | 4.30c. |
| Reinforcing steel bars, square, twisted and deformed | 2.50c. to 3.00c. |
| Cold-finished steel, rounds and hexagons | 3.35c. |
| Cold-finished steel, squares and flats | 3.85c. |
| Steel hoops | 3.60c. |
| Steel bands, No. 12 gage to 1/4-in., inclusive | 3.35c. |
| Spring steel | 5.00c. |
| Black sheets (No. 24) | 4.00c. |
| Galvanized sheets (No. 24) | 4.75c. |
| Blue annealed sheets (No. 10) | 3.15c. |
| Diamond pattern floor plates— | |
| 1/4-in. | 5.30c. |
| 3/8-in. | 5.50c. |
| Rails | 3.20c. |
| Swedish iron bars | 6.60c. |

*For 50 bundles or more; 10 to 49 bundles, 4.25c. base; 1 to 9 bundles, 4.50c. base.

†For 50 bundles or more; 10 to 49 bundles, 5.10c. base; 1 to 9 bundles, 5.45c. base.

phia, is obtained, while deliveries on contracts are at 1.85c., Pittsburgh, or 2.17c., Philadelphia.

Shapes.—Local structural steel projects consist chiefly of tonnages that have been pending for several weeks. Barges, floats and a tugboat hull for the Pennsylvania Railroad have not yet been awarded to a builder. Ten New York Central Railroad barges, which are to be constructed of 12-in. channels, about 300 tons or more to each barge, are to be built by the Dravo Contracting Co., Pittsburgh, and the Atlantic-Ellis Channel System, Inc., New York. On current small lot purchases of shapes, 2.05c., Bethlehem, 2.025c., Pottsville, or 2.17c. to 2.18c., delivered Philadelphia, are quoted. Deliveries on second quarter contracts are being made at 2c., Bethlehem, or 2.13c., Philadelphia, and there are still a few tonnages that have been carried over from the first quarter at \$1 a ton less.

Plates.—Specifications against contracts at 2c., Coatesville, or 2.10c., delivered Philadelphia, are coming in freely, but new purchasing is limited. On new business, however, 2.05c., Coatesville, or 2.15c., delivered Philadelphia, seems to be generally maintained.

Sheets.—Eastern Pennsylvania mills have not generally followed the action of an Ohio mill in revising blue annealed sheets to 2c., base Pittsburgh, and black to 2.75c., Pittsburgh. While there is weakness in the market, 2.10c., base, is being quoted here on small tonnages of blue annealed sheets, so that prices are represented by a range of 2c. to 2.10c. per lb. Galvanized sheets are 3.65c. to 3.75c. per lb., Pittsburgh, while black sheets seem to be rather generally quoted at 2.75c. to 2.85c., Pittsburgh.

Warehouse Business.—Efforts to establish a quantity differential on black and galvanized sheets, reported a week ago, were not completely successful and local jobbers have adopted a substitute plan whereby three different base prices for sheets, depending upon the quantity purchased, will be quoted. For 50 bundles or more black sheets at 4c. per lb., base, and galvanized, 4.75c., base; for 10 to 49 bundles black sheets are 4.25c. and galvanized, 5.10c., base; and for one to nine bundles black sheets are 4.50c. and galvanized, 5.45c., base. There is a 25c. per 100 lb. extra for corrugated sheets.

Imports.—In the week ended April 14 a total of 8250 gross tons of ore arrived at this port, 6250 tons of iron ore from Algeria and 2000 tons of chrome ore from Portuguese Africa. Pig iron arrivals totaled 1055 tons, of which 649 tons was Indian and 406 tons Dutch iron. Steel arrivals consisted of 72 tons of structural shapes, 66 tons of hoops and bands and seven tons of steel bars from France and 369 tons of bars and 200 tons of structural shapes from Belgium.

Old Material.—Prices are unchanged. Buying by eastern Pennsylvania consumers is light. A Harrisburg mill has bought bundled sheets at \$10.50 per ton, delivered, and yard grade of heavy melting steel at \$11 per ton, delivered. A Phoenixville company, which has been offering \$10 per ton, delivered, for machine shop turnings is now offering \$10.50 per ton for a sizable tonnage. No. 1 heavy melting steel is unchanged at \$13.50 to \$14 per ton, delivered, and shipments are going to Bethlehem, Conshohocken and Coatesville.

Prices per gross ton delivered consumers' yards, Philadelphia district:

| | |
|--|--------------------|
| No. 1 heavy melting steel | \$13.50 to \$14.00 |
| Scrap T rails | 13.00 to 13.50 |
| No. 2 heavy melting steel | 11.00 to 11.50 |
| No. 1 railroad wrought | 14.50 to 15.00 |
| Bundled sheets (for steel works) | 10.50 |
| Machine shop turnings (for steel works) | 10.50 |
| Heavy axle turnings (or equivalent) | 12.00 to 12.50 |
| Cast borings (for steel works and rolling mill) | 10.50 to 11.00 |
| Heavy breakable cast (for steel works) | 15.50 to 16.00 |
| Railroad grate bars | 12.00 to 12.50 |
| Stove plate (for steel works) | 12.00 |
| No. 1 low phos. heavy, 0.04 per cent and under | 17.50 to 18.00 |
| Couplers and knuckles | 15.50 to 16.00 |
| Rolled steel wheels | 15.50 to 16.00 |
| No. 1 blast furnace scrap | 10.50 to 11.00 |
| Machine shop turnings (for rolling mill) | 11.00 to 11.25 |
| Wrought iron and soft steel pipes and tubes (new specifications) | 12.00 to 12.50 |
| Shafting | 17.50 to 18.00 |
| Steel axles | 19.00 to 20.00 |
| No. 1 forge fire | 11.00 to 11.50 |
| Steel rails for rolling | 14.75 to 15.25 |
| Cast iron carwheels | 15.50 to 16.00 |
| No. 1 cast | 16.00 to 16.50 |
| Cast borings (for chemical plant) | 14.50 to 15.00 |

New York

Steel Shipments Heavy But New Demand Lessens—Pig Iron Quieter

NEW YORK, April 17.—Buying of pig iron is confined mainly to small lots for early delivery. The volume of this business is of fair proportions, bookings by local sellers having totaled 7500 tons for the week, or about 500 tons more than in the previous week. While there is virtually no interest in iron for third quarter delivery, shipments to foundries are increasing, indicating a gain in melt. The Chrome Steel Works, Carteret, N. J., has bought 1000 tons of low phosphorus, and the Lorain Steel Co., Johnstown, Pa., is expected to close in a day or two on a like tonnage. Pending business in foundry grades is light, probably totaling less than 1000 tons. A tentative inquiry is current, however, for 2000 to 3000 tons. Buffalo foundry iron is still available at \$16 to \$16.50, base furnace. Eastern Pennsylvania producers continue to quote \$20, base furnace, for foundry, without obtaining much business. All of the Dutch iron recently unloaded at Bridgeport, Conn., has been sold.

Prices per gross ton, delivered New York district:

| | |
|--|--------------------|
| Buffalo No. 2 fdy., sil. 1.75 to 2.25 | \$20.91 to \$21.91 |
| East. Pa. No. 2 fdy., sil. 1.75 to 2.25 | 20.39 to 22.52 |
| East. Pa. No. 2X fdy., sil. 2.25 to 2.75 | 20.89 to 23.02 |
| East. Pa. No. 1X fdy., sil. 2.75 to 3.25 | 21.39 to 23.52 |

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

Finished Steel.—Although shipments of steel to consumers in this district on specifications against contracts continue at an undiminished rate, the amount of new buying is extremely light. Most of the larger users have provided for their needs for all of this month and in not a few instances for most, if not all, of next month. With such wide coverage, there have been few tests of prices on those products which in other markets have shown weakness, notably sheets and cold-rolled strip steel. Black sheets are available at 2.80c. and 2.85c., Pittsburgh, while current sales of galvanized sheets are at 3.65c. to 3.75c., Pittsburgh. Blue annealed sheets are still holding to 2.10c. on a majority of transactions, notwithstanding that 2c., Pittsburgh, has been done in other districts on some of the larger sales. A few makers of cold-rolled strip have taken orders at 2.75c., Pittsburgh, for three tons or more, but other makers have succeeded in getting higher prices. In plates, shapes and bars the price situation is unchanged, except that the most recent advance of \$1 a ton is not holding on lots of a carload or more, bars being obtainable at 1.85c., Pittsburgh; shapes at 2c., Bethlehem, and plates at 2c., Coatesville. The New York Central Railroad has distributed orders for a few thousand tons of steel on which bids were publicly taken a few weeks ago. The plate tonnage was divided among at least three mills on quotations of 1.85c., delivered Newberry Junction; 1.85c., Cleveland mill, and 1.90c., West Seneca, N. Y. Structural steel awards bulked large, but were made up of a few good-sized tonnages, among which were 5000 tons of subway work and 4400 tons for the Governor Clinton Hotel in New York. New bids will be asked for on 10,000 tons of fabricated steel for the Jackson Avenue subway in Long Island City. Projects pending include 12,000 tons for a bridge at Charleston, S. C., and 3000 tons for a bridge over Lake Champlain.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Cast Iron Pipe.—Prices of Northern makers of pressure pipe are slightly firmer, but have shown no tendency to advance. At the opening of bids today by the Department of Purchase, New York, on 2700 tons of water pipe, low bidders were the Warren Foundry & Pipe Co. on 1000 tons at \$38.40 per net ton, delivered, the Donaldson Iron Co. on 1000 tons at \$37.90 per net ton, delivered, and the United States Cast Iron Pipe & Foundry Co. on 700 tons at \$38.25. White Plains, N. Y., has awarded 500 tons and Bloomfield, N. J., 100 tons of water pipe to the Warren Foundry & Pipe Co.

An inquiry for a contract in Colombia specifies 20 kilometers of 24-in. water pipe (about 9000 tons).

Prices per net ton, delivered New York: Water pipe 6-in. and larger, \$36.25 to \$37.25; 4-in. and 5-in., \$41.25 to \$42.25; 3-in., \$51.25 to \$52.25; Class A and gas pipe, \$4 to \$5 extra.

Warehouse Business.—Although quantity differentials are now in effect on plates, shapes, bars, hoops, bands, diamond pattern plates and blue annealed sheets, the current volume of purchasing has not as yet provided much of a test. April business has been good and, although orders are small, the total for the month is expected to exceed that of March.

Coke.—Buying is in small volume. Prices of Connells-ville coke are weak. Standard foundry is offered at \$3.50 per ton, Connellsville, and standard furnace at \$2.75 to \$2.85 per ton, Connellsville. Delivered prices

Warehouse Prices, f.o.b. New York

| | Base per Lb. |
|---|----------------------------|
| Plates and structural shapes..... | 3.30c. |
| Soft steel bars and small shapes..... | 3.25c. |
| Iron bars..... | 3.24c. |
| Iron bars, Swedish charcoal..... | 7.00c. to 7.25c. |
| Cold-finished shafting and screw stock— | |
| Rounds and hexagons..... | 3.40c. |
| Flats and squares..... | 3.90c. |
| Cold-rolled strip, soft and quarter hard, | |
| 5.15c. to 5.40c. | |
| Hoops..... | 4.50c. |
| Bands..... | 4.00c. |
| Blue annealed sheets (No. 10 gage)..... | 3.90c. |
| Long terre sheets (No. 24)..... | 5.80c. |
| Standard tool steel..... | 12.00c. |
| Wire, black annealed..... | 4.50c. |
| Wire, galvanized annealed..... | 5.15c. |
| Tire steel, 1½ x ½ in. and larger..... | 3.30c. |
| Smooth finish, 1 to 2½ x ¼ in. and larger | |
| Open-hearth spring steel, bases..... | 3.65c. to 4.50c. to 7.00c. |
| Machine bolts, cut thread: Per Cent Off List | |
| ¾ x 6 in. and smaller..... | 55 to 60 |
| 1 x 30 in. and smaller..... | 50 to 50 and 10 |
| Carriage bolts, cut thread: | |
| ¾ x 6 in. and smaller..... | 55 to 60 |
| ¾ x 20 in. and smaller..... | 50 to 50 and 10 |
| Coach screws: | |
| ¾ x 6 in. and smaller..... | 55 to 60 |
| 1 x 16 in. and smaller..... | 50 to 50 and 10 |
| Boiler Tubes— Per 100 Ft. | |
| Lap welded steel, 2-in..... | \$17.33 |
| Seamless steel, 2-in..... | 20.24 |
| Charcoal iron, 2-in..... | 25.00 |
| Charcoal iron, 4-in..... | 67.00 |
| Discounts on Welded Pipe | |
| Standard Steel— | Black Galv. |
| ½-in. butt..... | 46 29 |
| ¾-in. butt..... | 51 37 |
| 1-3-in. butt..... | 53 39 |
| 2½-6-in. lap..... | 48 35 |
| 7 and 8-in. lap..... | 44 17 |
| 11 and 12-in. lap..... | 37 12 |
| Wrought Iron— | |
| ½-in. butt..... | 5 +19 |
| ¾-in. butt..... | 11 + 9 |
| 1-1½-in. butt..... | 14 + 6 |
| 2-in. lap..... | 5 +14 |
| 3-6-in. lap..... | 11 + 6 |
| 7-12-in. lap..... | 3 +16 |
| Tin Plate (14 x 20 in.) | |
| | Prime Seconds |
| Coke, 100 lb. base box..... | \$6.45 \$6.20 |
| Charcoal, per box— | A AAA |
| IC..... | \$9.70 \$12.10 |
| IX..... | 12.00 14.25 |
| IXX..... | 13.90 16.00 |
| Terne Plate (14 x 20 in.) | |
| IC—20-lb. coating..... | \$10.00 to \$11.00 |
| IC—30-lb. coating..... | 12.00 to 13.00 |
| IC—40-lb. coating..... | 13.75 to 14.25 |
| Sheets Box Annealed—Black, C. R. One Pass | |
| | Per Lb. |
| Nos. 18 to 20..... | 3.80c. to 4.00c. |
| No. 22..... | 3.95c. to 4.15c. |
| No. 24..... | 4.00c. to 4.20c. |
| No. 26..... | 4.10c. to 4.30c. |
| No. 28* | 4.25c. to 4.45c. |
| No. 30..... | 4.50c. to 4.70c. |
| Sheets, Galvanized | |
| | Per Lb. |
| No. 14..... | 4.35c. |
| No. 16..... | 4.45c. |
| No. 18..... | 4.35c. to 4.60c. |
| No. 20..... | 4.50c. to 4.75c. |
| No. 22..... | 4.55c. to 4.80c. |
| No. 24..... | 4.70c. to 4.95c. |
| No. 26..... | 4.95c. to 5.20c. |
| No. 28* | 5.20c. to 5.45c. |
| No. 30..... | 5.60c. to 5.85c. |
| *No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb. | |

of special brands are: To northern New Jersey, Jersey City and Newark, \$8.71 to \$8.81 per net ton; to New York and Brooklyn, \$9.59 to \$9.69 per net ton. By-product coke is quoted at \$9 to \$9.40 per net ton, Newark or Jersey City, N. J., and \$10.06 to \$10.29 per ton, New York or Brooklyn.

Ferroalloys.—Interest centers in the price which will prevail on contracts for ferromanganese for second half. This may develop in the near future. Thus far no alloy is reported to have been sold for that delivery. There is some talk that a higher price than the present quotation of \$100, seaboard, may be announced. Specifications on present contracts, which cover requirements, are said to be expanding. New business in spiegeleisen is confined to small lots at prevailing quotations. Specifications on contracts for other ferroalloys are reported heavy.

Reinforcing Bars.—Parker & Graham, Inc., Paterson, N. J., has been awarded the contract for a highway bridge across the Raritan River at New Brunswick, N. J., which will require 1700 tons of concrete reinforcing bars. A considerable tonnage of bars is being placed for road work in New Jersey, mostly in small contracts. Road work is also becoming more active in Westchester County and lower New York State, but here as well as in New Jersey wire mesh is being used in considerable quantities. The Truscon Steel Co. will supply 400 tons of bars for a section of the New York subway. On another section in Long Island City, the original bids on the general contract have been rejected and the job will be readvertised. The 2c., Pittsburgh, mill price is being adhered to on the usual run of small jobs. Warehouse prices are unchanged.

Old Material.—All grades of scrap remain at last week's prices. Shipments to eastern Pennsylvania consumers are for the most part confined to No. 1 heavy melting steel, yard grade of heavy melting steel, machine shop turnings, borings and turnings, stove plate, locomotive grate bars and heavy breakable cast. Some specification pipe is moving to Lebanon and Columbia, Pa., consumers, brokers paying \$12 and \$12.50 per ton, delivered. While there is still pressure from buyers to obtain lower prices, the market seems to have reached bottom in that sellers are unwilling to enter into contracts at less than the current quotations.

Dealers' buying prices per gross ton f.o.b. New York:

| | |
|---|--------------------|
| No. 1 heavy melting steel..... | \$10.00 to \$10.85 |
| Heavy melting steel (yard)..... | 6.75 to 7.25 |
| No. 1 heavy breakable cast..... | 11.25 to 12.00 |
| Stove plate (steel works)..... | 7.75 to 8.00 |
| Locomotive grate bars..... | 8.00 to 8.50 |
| Machine shop turnings..... | 6.50 to 7.25 |
| Short shoveling turnings..... | 6.50 to 7.25 |
| Cast borings (blast furnace or steel works)..... | 6.25 to 7.25 |
| Mixed borings and turnings..... | 6.50 to 7.25 |
| Steel car axles..... | 15.50 to 16.00 |
| Iron car axles..... | 23.75 to 24.75 |
| Iron and steel pipe (1 in. dia., not under 2 ft. long)..... | 7.75 to 8.25 |
| Forge fire..... | 6.75 to 7.00 |
| No. 1 railroad wrought..... | 10.00 to 10.50 |
| No. 1 yard wrought, long..... | 8.50 to 9.00 |
| Rails for rolling..... | 10.00 to 10.50 |
| Cast iron car wheels..... | 10.75 to 11.25 |
| Stove plate (foundry)..... | 8.50 to 9.00 |
| Malleable cast (railroad)..... | 10.00 |
| Cast borings (chemical)..... | 11.00 to 11.50 |

Prices per gross ton, delivered local foundries:

| | |
|--|--------------------|
| No. 1 machinery cast..... | \$13.75 to \$14.25 |
| No. 1 heavy cast (columns, building materials, etc.), cupola size..... | 11.75 to 12.25 |
| No. 2 cast (radiators, cast boilers, etc.)..... | 11.25 to 11.75 |

Warehouse Prices, f.o.b. Cleveland

| | Base per Lb. |
|--|------------------|
| Plates and structural shapes..... | 3.00c. |
| Soft steel bars..... | 3.00c. |
| Reinforcing steel bars..... | 2.25c. to 2.75c. |
| Cold-finished rounds and hexagons..... | 3.65c. |
| Cold-finished flats and squares..... | 4.15c. |
| Hoops and bands..... | 3.65c. |
| Cold-finished strip..... | *5.95c. |
| Black sheets (No. 24)..... | 3.75c. |
| Galvanized sheets (No. 24)..... | 4.40c. to 4.60c. |
| Blue annealed sheets (No. 10)..... | 3.25c. |
| No. 9 annealed wire, per 100 lb..... | \$2.90 |
| No. 9 galvanized wire, per 100 lb..... | 3.35 |
| Common wire nails, base per keg..... | 2.90 |

*Net base, including boxing and cutting to length.

Cleveland

Motor Industry Still Principal Steel Buyer—Ore Prices Named

CLEVELAND, April 17.—Orders and specifications for steel bars, plates and structural material are fairly plentiful, but they are for small tonnages. The same situation applies to sheets and to hot-rolled strip steel in this territory. Orders from the automotive industry continue heavy, particularly for auto body sheets and hot-rolled strip steel, and some of the mills are filled up on these two products until late in May. With the rather slow but steady increase in production by the Ford Motor Co., larger steel orders are coming from that company.

Prices are holding firm at 1.85c., Pittsburgh, for steel bars, plates and structural material and quite a few small lot miscellaneous orders are being taken at 1.90c. Local mills quote steel bars at 1.85c., Cleveland. Sheet prices are weak except on auto body sheets, which are holding at the recent decline, now generally in effect. There is also irregularity in wide strip steel.

Structural orders continue light, the largest of the week being 1200 tons, and not much new inquiry is coming out.

The announcement of the reestablishment of last year's ore prices for 1928 attracted less interest than usual because this was generally expected.

Pig Iron.—Sales decreased further the past week, the business taken by Cleveland interests totaling 17,000 tons, compared with 26,000 tons during the previous week. Much of the business was in small lots from consumers who are buying from hand to mouth or small foundries that are purchasing only enough iron to carry them through the second quarter. There is little new inquiry. Prices are well stabilized at the quotations that have prevailed for some time. Lake furnaces are adhering to \$17 for No. 2 foundry and malleable iron, except for shipment to competitive points, principally in southern Ohio, where some irregularity exists. Lake furnaces are asking \$16.75 for shipment to these competitive points, but this price is being shaded. In Michigan the market is firm at \$18. Shipping orders show some gain from foundries outside of the automotive industry and automobile foundries are taking fully as much iron as last month. Most furnaces are shipping more iron than they are making.

Prices per gross ton at Cleveland:

| | |
|---|------------------|
| N'th'n No. 2 fdy., sil. 1.75 to 2.25..... | \$18.50 |
| Southern fdy., sil. 1.75 to 2.25..... | 22.00 |
| Malleable..... | 18.50 |
| Ohio silvery, 8 per cent..... | 28.00 |
| Basic, Valley furnace..... | 17.00 |
| Standard low phos., Valley furnace..... | \$26.50 to 27.00 |

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Sheets.—Mills are getting heavy specifications for auto body sheets from the Detroit territory, but new demand has slowed down somewhat, as consumers placed large orders last month against old contracts. Consumers in this territory are ordering small lots for immediate needs. Blue annealed sheets have settled down to 2c., Pittsburgh base, the regular 2.10c. price having virtually disappeared. Black sheet prices appear to be holding steadily at recent reductions, the common range being 2.75c. to 2.80c., Pittsburgh. Galvanized sheets are weak. These are quoted at 3.65c., Pittsburgh. Auto body sheets are holding at the recent \$3 a ton price reduction to 4c. Metal furniture sheets, following black sheets downward, are \$2 a ton lower.

Strip Steel.—Specifications against contracts for hot-rolled strip from the automotive industry are heavy, but new demand is moderate. Mills were able to close considerable tonnage at prices that prevailed during the first quarter and somewhat below current quotations. However, the market lacks strength, and there are reports of quotations only slightly above some of the low net prices at which first quarter business was taken. The demand for cold-rolled strip is not as heavy as for hot-rolled material. While large buyers have

been able to contract at 3c., base Cleveland, or 2.75c. for three tons and over, the regular 3.15c. base is being maintained for small consumers. While there has been shading of \$1 a ton on fender stock to 4.15c., this material is lower than auto body sheets when extras are added, and consequently has not declined with the latter, being generally quoted at 4.20c.

Iron Ore.—Ore prices that prevailed last year were reestablished by the sale of a round tonnage April 16, more complete details of which will be found in another column.

Semi-Finished Steel.—While not much new business is being placed, the demand is holding up to recent volume and the leading local producer continues to operate 13 out of 14 open-hearth furnaces. Quotations are unchanged at \$33, Cleveland. Irregularity in forging billets is indicated by a car lot sale at \$37.

Warehouse Business.—Sales show a slight gain over those in March. Some seasonal demand has developed from the building field. Sheets are moving slowly. Prices are being well maintained.

Cold-Finished Steel.—The Ford Motor Co. recently placed some business with parts makers in this territory that has resulted in an increase in specifications. Locally, the price is firm at 2.25c., Cleveland, but irregularities are reported in the Detroit territory.

Wire Products.—Nails are moving better than recently. The market is holding to \$2.65 per keg in this territory, although lower prices are reported in southern Ohio.

Reinforcing Bars.—New inquiry is confined to small lots and the only award of any size during the week was for 100 tons. The price for stock shipment remains around 2.25c. Rail steel bars are quoted at 1.75c., mill.

Coke.—Coke shipments are fair, but there is little new demand. Prices are unchanged at \$7.75, Painesville, for Ohio by-product foundry coke and \$3.75 to

\$5.10, ovens, for Connellsville grades. There is still a range of from \$2.50 to \$2.75 on heating coke.

Bolts, Nuts and Rivets.—Bolts and nuts continue to move in good volume in specifications against contracts. While rivets are rather slow, they are more active than recently.

Old Material.—The firmer market situation that has developed in the Pittsburgh territory has not been reflected in any added strength in the Cleveland market. No new business is coming from the mills and, with shipments closely restricted, dealers have little tonnage to place against existing orders. Dealers are able to buy car lots of heavy melting steel at \$13.50, or 25c. a ton under the more commonly quoted price. They are showing caution in buying scrap for future delivery, believing that if there is any reduction in mill operations in the early summer scrap prices may go lower.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades

| | |
|----------------------------------|--------------------|
| No. 1 heavy melting steel..... | \$13.75 to \$14.00 |
| No. 2 heavy melting steel..... | 13.25 to 13.50 |
| Compressed sheet steel..... | 12.75 to 13.00 |
| Light bundled sheet stampings... | 11.50 to 11.75 |
| Drop forge flashings..... | 12.00 to 12.50 |
| Machine shop turnings..... | 8.00 to 8.50 |
| No. 1 railroad wrought..... | 11.50 to 12.00 |
| No. 2 railroad wrought..... | 13.50 to 14.00 |
| No. 1 busheling..... | 11.00 to 11.25 |
| Pipes and flues..... | 9.00 to 9.50 |
| Steel axle turnings..... | 12.50 to 13.00 |

Acid Open-Hearth Grades

| | |
|---|----------------|
| Low phosphorus forging crops... | 16.50 to 17.00 |
| Low phosphorus, billet, bloom and slab crops..... | 17.00 to 17.50 |
| Low phosphorus sheet bar crops... | 16.50 to 17.00 |
| Low phosphorus plate scrap..... | 16.00 to 16.50 |

Blast Furnace Grades

| | |
|----------------------------------|----------------|
| Cast iron borings..... | 10.00 to 10.25 |
| Mixed borings and short turnings | 10.00 to 10.25 |
| No. 2 busheling..... | 10.00 to 10.25 |

Cupola Grades

| | |
|--------------------------|----------------|
| No. 1 cast..... | 16.50 to 17.00 |
| Railroad grate bars..... | 11.00 to 12.00 |
| Stove plate..... | 12.00 to 12.50 |
| Rails under 3 ft..... | 18.00 to 18.50 |

Miscellaneous

| | |
|-------------------------|----------------|
| Railroad malleable..... | 15.00 to 15.50 |
| Rails for rolling..... | 16.25 to 16.50 |

Company Activities and Commission Decisions

The Jones & Laughlin Steel Corporation on April 3 completed two years without a fatality at its South Side works, Pittsburgh. An average force of 5100 men worked approximately 30,000,000 man-hours in that period. The departments of the works located on the north bank of the Monongahela River, employing about 2000 men, have gone 90 days without a lost-time accident.

Acme Steel Co., Chicago, reports that the sales for the first quarter of 1928 were approximately 32 per cent ahead of the same period last year, and were the largest in the history of the company. The company recently placed in operation a new electro-galvanizing sheet plant.

The American Steel & Wire Co. has recently put in operation a new welded-fabric mill addition at its Anderson, Ind., plant.

The Carnegie Steel Co. will rebuild and enlarge No. 2 stack at its Ohio Works, Youngstown. At completion the furnace will have a capacity of 800 tons daily and will be the largest of the group of six furnaces. The Pennsylvania Engineering Works, New Castle, Pa., will do the work.

Two combined coke pushers, coal levelers and door extractors will be installed at the South Chicago plant of the Youngstown Sheet & Tube Co. by the Wellman-Seaver-Morgan Co., Cleveland, which has been awarded the contract by the Koppers Co., general contractor for the coke oven plant.

The McClintic-Marshall Co. has removed its district sales office in Cincinnati from 624 Union Central Building to room 1208 in the same building.

In a proposed report to the Interstate Commerce Commission last week, R. J. Olentine, examiner, passing upon a complaint of the Denver Rock Drill Mfg. Co., Denver, Colo., held that rates and minima on plain bar steel, in carloads, from Syracuse, N. Y., and Milwaukee to Denver are not unreasonable.

Dismissing a complaint of the Federated Metals Corporation, New York, the Interstate Commerce Commission, in a report made public last week, held that rates on brass and copper ingots, in carloads, from Pittsburgh, Chicago and St. Louis to points in Official Classification territory are not unreasonable. Commodity rates equivalent to sixth class are generally maintained from Chicago to Pittsburgh. From St. Louis fifth class rates apply with but few exceptions.

Termination of the receivership of the Standard Stamping Co., 2000 North Broadway, St. Louis, in effect since July, 1926, will probably be accomplished, following an order by Federal Court, asking George W. Weigand and his sons, majority stockholders in the company, to purchase the stock of James L. Minnis, principal minority stockholder.

The Federal Trade Commission has resumed the taking of testimony in the case of the Aluminum Co. of America in which certain contracts and agreements made by the company for the sale of sheet aluminum are questioned.

Orders received by the General Electric Co., Schenectady, N. Y., for the first three months of the present year amounted to \$79,925,840, compared with \$77,550,581 for the corresponding quarter in 1927 and with \$86,433,658 for the first quarter of 1926.

San Francisco

Reinforcing Steel Awards 7000 Tons —5200 Tons for Drainage Work

SAN FRANCISCO, April 14 (*By Air Mail*).—Among the more important awards this week were 5200 tons of bars for a drainage improvement project at Los Angeles and 376 tons for a factory for Johns-Manville Co. at Pittsburg, Cal. Demand generally is considered fair for this season of the year. Much new work is in sight.

Pig Iron.—Both sales and inquiries for foundry pig iron were limited to small lots for prompt shipment, and little or no improvement is noted in general demand for castings. Importations of foreign iron in January totaled close to 1400 tons, Los Angeles foundries taking 850 tons. The bulk of this material, 1047 tons, came from the British Indies. Prices continue unchanged.

Prices per gross ton at San Francisco:

| | | |
|-------------------------------------|-------|--------------------|
| *Utah basic | | \$25.00 to \$26.00 |
| *Utah foundry, sil. 2.75 to 3.25 | ... | 25.00 to 26.00 |
| **Indian foundry, sil. 2.75 to 3.25 | ... | 24.00 to 25.00 |
| **German foundry, sil. 2.75 to 3.25 | ... | 24.25 |

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Reinforcing steel bar awards totaled close to 7000 tons. In addition to the tonnages mentioned above, 420 tons for a warehouse at Seattle and 240 tons for the Transportation Building in the same city were awarded. The largest pending project calls for 1220 tons for Drainage Improvement District No. 22 at Los Angeles, bids on which have been opened. January importations of foreign bars totaled 4322 tons, compared with 3675 tons for the same month last year. Of this total, 4041 tons came from Belgian producers, San Francisco taking 1749 tons and Portland 1496 tons.

Plates.—The Pittsburgh-Des Moines Steel Co. was low bidder on 445 tons for siphons for the Kittitas Canal project in Washington. The only other inquiry up for figures calls for 700 tons for a car float for the Santa Fe at San Francisco. Prices continue unchanged at 2.30c. c.i.f.

Shapes.—Fabricated awards this week totaled 1066 tons. The Moore Dry Dock Co. took 250 tons for hangars at Oakland and McClintic-Marshall Co. was awarded 150 tons for the city of Los Angeles. Considerable new work is being planned, and it is thought that most of it will come out for figures during the next 30 days. Pending business exceeds 10,000 tons. C. J. Nystedt of Stockton got the general contract for a bridge over the Sacramento River at Freeport, calling for 606 tons; the steel contract has not been let. Los Angeles is calling for bids on 685 tons of I-beams by April 23. Importation of foreign material during January totaled 1936 tons, as against 2674 tons in January, 1927. San Francisco took 1149 tons. More than 1800 tons came from Belgian mills. Domestic plain material is firm at 2.35c. c.i.f.; foreign shapes are quoted at about 1.50c., c.i.f., duty paid.

Cast Iron Pipe.—Demand for cast iron pipe has improved, but awards were not heavy this week. George Herz & Co., San Bernardino, took 129 tons of 8 to 24-in. class B pipe for San Bernardino, Cal. An unnamed interest took 526 tons of 4 to 8-in. class B pipe for the East Palo Alto Waterworks District, Redwood City, Cal. Bids will be opened next week on the largest tonnages of cast iron pipe ever to come up for figures on the Coast. The Wildcat and Sequoia aqueducts in

Oakland will require respectively 17,440 and 13,250 tons of 50 to 60-in. class C pipe. B. Nicoll & Co. were low on 234 tons of 24-in. class B pipe for Los Angeles. Long Beach, Cal., will open bids on April 17 for 8744 tons of 4 to 30-in. class B pipe. Monrovia, Cal., opens bids on April 16 for 2764 tons of 4 to 20-in. classes A and B pipe. Imports of cast iron pipe for January totaled 1823 tons, as against 6013 tons for the same month last year. Seattle took the largest portion, or 965 tons. More than 1400 tons came from French makers. Prices now range from \$35 to \$36 a ton, delivered, on 6-in. and larger.

Standard Pipe.—E. W. Redman, Fresno, Cal., took 125 tons of 2 to 8-in. O. D. pipe for the Armona Public Utility District at Armona, Cal. The only pending inquiry of size involves 710 tons of 4 to 20-in. lapweld pipe for Monrovia, Cal., bids on which go in April 16. Pipe prices have advanced 5 per cent, reflecting the advance last week in the Eastern markets. Imports of tubular products in January aggregated 1089 tons, compared with 5117 tons in January, 1927. Of the total, Los Angeles took 850 tons.

Coke.—Sales and inquiries are confined to small lots. Prices on English beehive and by-product coke range from \$16 to \$17 a net ton on the former, delivered dock, and from \$11.50 to \$13 on the latter.

Youngstown

Losses in Bar Output Offset by Gains in Steel Pipe

YOUNGSTOWN, April 17.—Bar mill operations in this district have suffered a recession from the recent rate of activity because of the fact that makers of cold-finished steel bars and shafting drew very heavily against first quarter contracts last month and now are ordering sparingly. But such loss as this decline in new bar business has created in ingot production has been largely made good by a better demand for standard-weight pipe and a heavier operation of furnaces making that product. This is the reaction to the higher prices recently announced by steel pipe makers under the lead of the Youngstown Sheet & Tube Co. On consigned accounts, jobbers are protected in price changes for 60 days and jobbers who handle tubular goods on their own account had a period of grace within which they could order at the old prices, for delivery at convenience of the mill, the tonnage equivalent to what mill records showed was a month's supply. The advance took the shape of a withdrawal of a so-called preferential discount of 5 per cent; on retailers' carloads, the discount was card plus two fives, and now is card and 5 per cent. While oil country goods continue to sell slowly, there is a better tone to the pipe market as a result of the increased activity in standard-weight pipe and the prospect that with the revision in prices there will come a passing of the irregularity and uncertainty that for months has marked the secondary market.

Much disappointment is felt locally over the recent price developments in the sheet market, especially the drop in price of automobile body sheets, which up to the time that one or two small producers voluntarily receded, gave promise of holding firmly to 4.15c., base. There is no complaint over the volume of sheet orders, but prices are keenly competitive and maintenance of the prices named for this quarter is not regarded as now possible, since on black sheets 2.80c., base, Pittsburgh, is fairly common and even 2.75c., base, is being encountered in some districts. The decline in black sheets has brought no further weakening in galvanized sheets, which are holding rather well at 3.65c., base, which was quoted before there was any definite decline in black sheets. In the formulation of schedules a year ago with the change in base gages, there was a spread of 85c. per 100 lb. between black and galvanized sheets and today's prices of 2.80c. and 3.65c. are in the same alignment. There is some shading in blue annealed sheets, but generally, 2.10c. for stock narrower than 40 in. is holding well.

Tin plate mills in this area are all well occupied,

Warehouse Prices, f.o.b. San Francisco

| | Base per Lb. |
|---|--------------|
| Plates and structural shapes | 3.15c. |
| Soft steel bars | 3.15c. |
| Small angles, $\frac{3}{8}$ -in. and over | 3.15c. |
| Small angles, under $\frac{3}{8}$ -in. | 3.55c. |
| Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{3}{4}$ -in. | 3.75c. |
| Spring steel, $\frac{1}{4}$ -in. and thicker | 5.00c. |
| Black sheets (No. 24) | 4.95c. |
| Blue annealed sheets (No. 10) | 3.90c. |
| Galvanized sheets (No. 24) | 5.50c. |
| Structural rivets, $\frac{1}{2}$ -in. and larger | 5.65c. |
| Common wire nails, base per keg | \$3.40 |
| Cement coated nails, 100-lb. keg | 3.40 |

and there is no complaint among strip makers as to the volume of business; there is not much satisfaction, however, over the prices at which strips, both hot- and cold-rolled, are moving. Good movement of wire, fence and fencing materials is noted, but it is generally on contracts written at less than is being asked on second quarter contracts. Nails still reflect in demand the fact that jobbers are heavily stocked as a result of large December purchases and liberal shipments over the first quarter of the year. Semi-finished steel is moving to non-integrated manufacturers steadily. There is no activity in pig iron, except for the purchases recently made by the A. M. Byers Co. of 10,000 tons of No. 3 foundry for its Girard, Ohio, works and a like amount of Bessemer iron for its Warren, Ohio, works. Scrap is firm, as the mills are demanding deliveries against old orders and the dealers are finding it necessary to go high to get enough tonnage to meet their obligations.

A good deal of new construction work is in process in the Youngstown district steel plants. The Carnegie Steel Co. is rebuilding its No. 2 blast furnace at its Ohio works, and when the work, which is being done by the Pennsylvania Engineering Works, New Castle, Pa., is completed the furnace will have a capacity of 1000 tons daily, making it the largest producing unit in the Valley districts. The Newton Steel Co., Newton Falls, Ohio, is making changes calculated to improve mill performance. The Trumbull Steel Co. has taken out a license under the patents of the Cold Metal Process Co., Youngstown, to install a mill for making strip tin plate.

Birmingham

Steel Market Continues Firm, but Pig Iron Demand Is Light

BIRMINGHAM, April 17.—The pig iron market continues to drift along, activity consisting of a fair number of spot sales in small lots. Producers have a good size tonnage of second quarter iron unsold. Stocks were increased during the last week when sales dropped below the average of recent weeks. The Tennessee company changed furnace No. 2 at Bessemer from basic to recarburizing iron on April 7 and furnace No. 6 at Ensley from recarburizing iron to foundry on April 11. Seventeen furnaces are in blast, nine of which are on foundry, six on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham district furnaces:

| | |
|-------------------------------------|---------|
| No. 2 foundry, 1.75 to 2.25 sh..... | \$16.00 |
| No. 1 foundry, 2.25 to 2.75 sh..... | 16.50 |
| Basic | 15.00 |

Finished Steel.—The market continues firm. More buyers are showing a tendency toward closing contracts. Inquiries are developing at a fair rate, and sales officials anticipate a satisfactory volume of business for the quarter. Structural steel fabricators and bar manufacturers report sales at a low rate during the past two weeks. A number of good projects are in prospect. The Tennessee company is now operating seven or eight open hearths at Ensley instead of eight or nine. Five are still in operation at Fairfield and the Gulf States Steel Co. continues to work four at Alabama City.

Cast Iron Pipe.—Sales for the past week were light and showed a decided drop from the preceding week. A fair volume of small orders constitutes the only new business. Inquiries are being received from Southern and Northern municipalities, and buying is expected to improve within the next two weeks. Shipments are increasing gradually. Base prices remain at \$29 to \$31.

Coke.—A fair amount of activity is found in spot sales of carload lots. Forward buying has been at a standstill during the past two weeks. All important consumers are covered for the second quarter and most of them are covered for the third quarter. Quotations continue at the same base price of \$5 for both spot and contract.

Old Material.—Sales of heavy melting steel and

steel rails have shown a noticeable improvement during the past week, and inquiries are more numerous. New business in other lines continues small. No changes have occurred in prices.

Prices per gross ton, delivered Birmingham district consumers' yards:

| | |
|----------------------------------|-------------------|
| Heavy melting steel..... | \$9.50 to \$10.00 |
| Scrap steel rails..... | 11.00 to 11.50 |
| Short shoveling turnings..... | 8.00 to 8.50 |
| Cast iron borings..... | 8.00 |
| Stove plate | 14.50 |
| Steel axles | 19.00 to 20.00 |
| Iron axles | 20.00 to 21.00 |
| No. 1 railroad wrought..... | 10.00 to 10.50 |
| Rails for rolling..... | 13.00 |
| No. 1 cast..... | 14.50 |
| Tramcar wheels | 12.50 to 13.50 |
| Cast iron carwheels..... | 12.00 to 13.00 |
| Cast iron borings, chemical..... | 13.50 to 14.00 |

St. Louis

Pig Iron Buying Active—Steel Operations Continue at High Rate

ST. LOUIS, April 17.—Buying of pig iron continues active. The St. Louis Gas & Coke Co. sold about 10,000 tons, while a leading Southern interest disposed of 1000 tons. Prices are firm. Melters are beginning to inquire for prices on their third-quarter requirements, although makers have not yet opened their books for that period. Of the local maker's sales, 5000 tons was to a radiator company, 1000 tons to a northern Illinois stove foundry, 600 tons to an East St. Louis melter and 200 tons to a southern Illinois concern, all foundry iron, and 1000 tons of malleable iron to an Illinois consumer; all for second quarter shipment. The largest of the Southern maker's orders was for 350 tons to a stove plant. Most of the buying is by melters outside of St. Louis. Inquiries total about 2000 tons, including 1000 tons for a local concern.

Prices per gross ton at St. Louis:

| | |
|-------------------------------------|--------------------|
| No. 2 fdy., sl. 1.75 to 2.25 f.o.b. | |
| Granite City, Ill. | \$19.50 to \$20.00 |
| Northern No. 2 fdy., delivered | |
| St. Louis | 20.66 |
| Southern No. 2 fdy., delivered... | 20.42 |
| Northern malleable, delivered.... | 20.66 |
| Northern basic, delivered..... | 20.66 |

Freight rates: 81c. from Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—Buying of foundry coke is in fair volume, consumers in the district finding it convenient to order from local by-product ovens as they require supplies. Dealers have not begun to buy domestic grades.

Finished Iron and Steel.—The volume of business received during the week by the Granite City Steel Co. showed a slight falling off, but more orders calling for small quantities were received than for some time, which is regarded as indicating that purchasers do not desire to build up stocks of too great proportions. Galvanized sheets are not active, but specifications are coming in at a rate warranting operations of approximately 75 per cent of capacity of this department of the Granite City Steel Co.; all other departments are operating at 100 per cent, the backlog of orders indi-

Warehouse Prices, f.o.b. St. Louis

| | Base per Lb. |
|--|-------------------|
| Plates and structural shapes..... | 3.25c. |
| Bars, soft steel or iron | 3.15c. |
| Cold-finished rounds, shafting and screw stock | 3.75c. |
| Black sheets (No. 24)..... | 4.45c. |
| Galvanized sheets (No. 24)..... | 5.25c. |
| Blue annealed sheets (No. 10)..... | 3.60c. |
| Black corrugated sheets (No. 24)..... | 4.50c. |
| Galvanized corrugated sheets..... | 5.30c. |
| Structural rivets | 3.75c. |
| Boiler rivets | 3.75c. |
| | Per Cent Off List |
| Tank rivets, $\frac{7}{8}$ -in. and smaller, 100 lb. or more | 70 |
| Less than 100 lb..... | 65 |
| Machine bolts | 60 |
| Carriage bolts | 60 |
| Lag screws | 60 |
| Hot-pressed nuts, squares, blank or tapped, 200 lb. or more..... | 60 |
| Less than 200 lb..... | 50 |
| Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more..... | 60 |
| Less than 200 lb..... | 50 |

eating a continuance of this rate for some time. Structural fabricators report that business is extremely dull. Reinforcing bar awards for the week totaled 465 tons, including 300 tons for an apartment house.

Old Material.—The market for old material continues weak. The only price change is a reduction of 50c. a ton on No. 1 machinery cast. Consumers are buying almost nothing, pending depletion of their stocks, and dealers are trading among themselves for the few unfilled orders on their books. Railroad lists: Southern Railway, 8700 tons; Chesapeake & Ohio, 9298 tons; International & Great Northern, 3260 tons; Chicago, Milwaukee & St. Paul, 1000 tons; Nickel Plate, 37 carloads, and Frisco Lines, 24 carloads.

Prices per gross ton, f.o.b. dealers' yards and delivered St. Louis district consumers' works:

| | |
|--|--------------------|
| Heavy melting steel..... | \$10.75 to \$11.25 |
| No. 1 locomotive tires..... | 12.00 to 12.50 |
| Heavy shoveling steel..... | 10.75 to 11.25 |
| Miscellaneous standard-section rails, including frogs, switches and guards, cut apart..... | 12.00 to 12.50 |
| Railroad springs..... | 13.00 to 13.50 |
| Bundles sheets..... | 8.75 to 9.25 |
| No. 2 railroad wrought..... | 10.75 to 11.25 |
| No. 1 busheling..... | 9.50 to 10.00 |
| Cast iron borings..... | 8.75 to 9.25 |
| Iron rails..... | 13.00 to 13.50 |
| Rails for rolling..... | 12.75 to 13.25 |
| Machine shop turnings..... | 6.50 to 7.00 |
| Steel car axles..... | 17.50 to 18.00 |
| Iron car axles..... | 23.50 to 24.00 |
| Wrought iron bars and transoms..... | 21.00 to 21.50 |
| No. 1 railroad wrought..... | 10.00 to 10.50 |
| Steel rails, less than 3 ft..... | 15.00 to 15.50 |
| Steel angle bars..... | 11.50 to 12.00 |
| Cast iron carwheels..... | 13.00 to 13.50 |
| No. 1 machinery cast..... | 13.00 to 13.50 |
| Railroad malleable..... | 10.75 to 11.25 |
| No. 1 railroad cast..... | 13.00 to 13.50 |
| Stove plate..... | 12.50 to 13.00 |
| Agricultural malleable..... | 12.00 to 12.50 |
| Relaying rails, 60 lb. and under..... | 20.50 to 23.50 |
| Relaying rails, 70 lb. and over..... | 26.50 to 29.00 |

Canada

Pig Iron Weaker—Larger Demand for Structural Shapes and Bars

TORONTO, ONT., April 17.—Canadian industrial plants are in a fairly strong position with regard to orders booked, while prospective business is in sufficient volume to warrant optimism on the part of iron and steel interests. Canada's external trade in iron and steel and their products is also in a favorable position. In February, Canada exported 3217 tons of steel to the United States; and in January and February exports totaled 8214 tons, which compares with 9330 tons for the first two months of last year. February imports of iron and steel from the United States amounted to 76,160 tons, and in January and February imports from this source totaled 137,807 tons, which compares with 108,109 tons for the first two months of 1927.

Pig Iron.—A steady demand for foundry and malleable iron for prompt delivery continues. Most of the current sales are one or two cars, but some orders for 100 to 200 tons have been placed. There is one inquiry for 1000 tons. Some recent transactions have been put through at \$23.10, a decline of 50c. a ton, while others have been booked at \$23.60, Toronto. In the Montreal market most of the sales are made at \$24.50.

Prices per gross ton:

| Delivered Toronto | |
|---------------------------------------|--------------------|
| No. 1 foundry, sil. 2.25 to 2.75..... | \$23.10 to \$23.60 |
| No. 2 foundry, sil. 1.75 to 2.25..... | 23.10 to 23.60 |
| Malleable..... | 23.10 to 23.60 |
| Delivered Montreal | |
| No. 1 foundry, sil. 2.25 to 2.75..... | \$24.50 to \$25.00 |
| No. 2 foundry, sil. 1.75 to 2.25..... | 24.50 to 25.00 |
| Malleable..... | 24.50 to 25.00 |
| Basic..... | 24.00 |
| Imported Iron at Montreal Warehouse | |
| Summerlee..... | 33.50 |
| Carron..... | 33.00 |

Structural Steel.—Demand grows for structural steel and reinforcing bars. Sales for the past week totaled close to 5000 tons for the Toronto and Montreal districts alone, while other large contracts are pending. For an extension of the Robert Simpson Co. store, Toronto, 2800 tons of structural steel and 1000

tons of reinforcing bars will be purchased; approximately 4000 tons of reinforcing bars and steel will be required for the new elevator for the Playfair interests to be erected in Toronto; 4000 tons of structural steel will be needed for the steel towers for the Detroit-Windsor international suspension bridge. While some contracts for steel have been placed for new bridges, there is 10,000 tons of bridge steel pending.

Old Material.—Following the active buying movement of the past month, during which time a number of consumers placed second quarter contracts, the demand has fallen off, and current sales are mostly in small tonnages for immediate needs of consumers. The price situation is unchanged.

Dealers' buying prices:

| Per Gross Ton | | Toronto | Montreal |
|----------------------------|--------|---------|----------|
| Heavy melting steel..... | \$9.00 | \$8.00 | |
| Rails, scrap..... | 10.00 | 10.00 | |
| No. 1 wrought..... | 9.00 | 11.00 | |
| Machine shop turnings..... | 7.00 | 6.00 | |
| Boiler plate..... | 7.00 | 7.00 | |
| Heavy axle turnings..... | 7.50 | 7.50 | |
| Cast borings..... | 7.50 | 6.00 | |
| Steel turnings..... | 7.00 | 6.50 | |
| Wrought pipe..... | 5.00 | 6.00 | |
| Steel axles..... | 14.00 | 19.00 | |
| Axles, wrought iron..... | 16.00 | 21.00 | |
| No. 1 machinery cast..... | | 16.00 | |
| Stove plate..... | | 12.00 | |
| Standard carwheels..... | | 14.50 | |
| Malleable..... | | 13.00 | |
| Per Net Ton | | | |
| No. 1 machinery cast..... | 15.00 | | |
| Stove plate..... | 9.00 | | |
| Standard carwheels..... | 13.00 | | |
| Malleable scrap..... | 13.00 | | |

Boston

Concessions on Large Sizes of Cast Iron Pipe—Steel Scrap Higher

BOSTON, April 17.—Pig iron sales in New England the past week were the smallest for any like period this year. The largest amount sold by any one stack was 500 tons and this was in small lots. Connecticut foundries are taking in iron on contract quite freely, and on the present basis of consumption many of them will be in the market for tonnages before long, but the outlook for business in other New England States is not particularly encouraging. No. 2 plain and No. 2X Buffalo iron is still available at \$16 a ton, furnace, all-rail shipment, and New York State furnaces and the Mystic Iron Works are meeting the delivered price. Several hundred tons of Indian No. 2X iron was sold at \$21.75 and \$22 a ton, Boston, duty paid.

Prices of foundry iron per gross ton, delivered to most New England points:

| | |
|------------------------------------|--------------------|
| Buffalo, sil. 1.75 to 2.25..... | \$20.91 to \$21.91 |
| Buffalo, sil. 2.25 to 2.75..... | 21.41 to 22.41 |
| East Penn., sil. 1.75 to 2.25..... | 23.15 to 23.65 |
| East Penn., sil. 2.25 to 2.75..... | 23.65 to 24.15 |
| Virginia, sil. 1.75 to 2.25..... | 25.71 |
| Virginia, sil. 2.25 to 2.75..... | 26.21 |
| Alabama, sil. 1.75 to 2.25..... | 22.91 to 24.77 |
| Alabama, sil. 2.25 to 2.75..... | 23.41 to 25.27 |

Freight rates: \$4.91 from Buffalo, \$3.65 from eastern Pennsylvania, \$5.21 all rail from Virginia, \$6.91 to \$8.77 from Alabama.

Coke.—Consumption of by-product foundry coke in Connecticut is increasing perceptibly, and there is also slight improvement in other New England States. New England foundry coke is still \$11 a ton, delivered within a \$3.10 freight rate zone. The Connecticut Coke Co., through coal dealers, is soliciting heating coke orders in Connecticut.

Shapes and Plates.—Fabricators are figuring some good-sized tonnages, which, with numerous small lots, give the market a more active appearance. Steel mill representatives quote 1.90c. per lb., base Pittsburgh, on standard shapes, but in the past week a mill took a round tonnage at 1.85c. Plate mills apparently are holding to 1.90c. per lb., base Pittsburgh, but no large tonnages to test prices have been in the market recently.

Cold-Rolled Strip.—New business is coming in slowly, current buying being on a hand-to-mouth basis. The American Steel & Wire Co. continues to quote 3.30c. per lb., base Worcester, Mass., for 1 to 3 ton lots.

Old Material.—No. 1 heavy melting steel is higher, \$9.50 a ton on cars at shipping points for Pittsburgh district delivery and \$9.25 for shipment to other Pennsylvania consuming points having been paid in several instances in the past week. Scrap T rails are doing better in price and quite a tonnage of relaying rails, including 600 tons shipped via the Panama Canal for a Pacific Coast lumber operation, have been sold at slightly better prices. Girder rails have been sold at \$8.10 a ton on cars at shipping point, although \$8 seems to be the average top price. Mixed borings and turnings were sold last week at \$5.75, \$6 and \$6.25 on cars, whereas in the previous week nothing higher than \$6 was reported. There is little demand for steel turnings except for blast furnace consumption, and prices have dropped. Bundled skeleton has been sold at prices ranging from \$5.60 to \$6.50 a ton on cars. The Mystic Iron Works continues to buy miscellaneous material, including pipe and stove plate, at \$10 a ton, delivered. Machinery cast and textile cast in Boston is slow, but small yards outside of the city are selling quite a little tonnage direct to foundries.

Buying prices per gross ton f.o.b. Boston rate shipping points:

| | | |
|--|-----------|--------|
| No. 1 heavy melting steel..... | \$9.25 to | \$9.50 |
| Scrap T rails | 8.50 to | 9.00 |
| Scrap girder rails..... | 7.50 to | 8.00 |
| No. 1 railroad wrought..... | 10.00 to | 10.25 |
| No. 1 yard wrought..... | 7.50 to | 8.00 |
| Machine shop turnings | 5.50 to | 5.75 |
| Cast iron borings (steel works and rolling mill)..... | 6.00 to | 6.25 |
| Bundled skeleton, long..... | 5.75 to | 6.25 |
| Forge flashings | 6.60 to | 7.25 |
| Blast furnace borings and turnings | 5.75 to | 6.25 |
| Forge scrap | 6.00 to | 6.50 |
| Shafting | 13.00 to | 13.50 |
| Steel car axles | 15.50 to | 16.00 |
| Wrought pipe (1 in. in diameter, over 2 ft. long)..... | 7.50 to | 8.00 |
| Rails for rolling..... | 10.00 to | 10.25 |
| Cast iron borings, chemical..... | 9.50 to | 10.00 |

Prices per gross ton delivered consumers' yards:

| | | |
|---------------------------|------------|---------|
| Textile cast | \$13.50 to | \$14.00 |
| No. 1 machinery cast..... | 15.00 to | 15.50 |
| No. 2 machinery cast..... | 13.00 to | 13.50 |
| Stove plate | 10.00 to | 10.50 |
| Railroad malleable | 13.00 to | 13.50 |

Cast Iron Pipe.—Brockton, Mass., has purchased 550 tons of 24-in. pipe for its water department from R. D. Wood & Co. and 350 tons of 24-in. pipe for its sewerage commission from the Warren Foundry & Pipe Co. Wellesley, Mass., has bought 350 tons of 6, 8 and 12-in. pipe from the Warren Foundry & Pipe Co., and Quincy, Mass., bought 350 tons of 6 to 12-in. cement lined pipe from the same maker. Everett, Mass., has contracted with the Warren company for its 1928 pipe requirements; the amount is not specified, but it probably will be several hundred tons. Winthrop, Mass., has placed 200 tons of 8-in. pipe with a Boston jobber. The United

States Cast Iron Pipe & Foundry Co. was the low bidder on 2600 tons of 12 and 18-in. pipe required by Attleboro, Mass., bids for which were opened last week; no award has been made. Competition for business in New England is keen, but a majority of sales of 6 to 12-in. pipe are at \$39.10 a ton, delivered common Boston freight rate points. Concessions are being made on larger sizes, however. Small pipe remains at \$44.10 a ton, delivered, as most foundries are well sold ahead. The usual \$5 differential is asked on class A and gas pipe.

Cincinnati

Recession in Demand for Steel Products—Pig Iron Sales About 2500 Tons

CINCINNATI, April 17.—Pig iron sales in the past week amounted to about 2500 tons, practically all of which consisted of lots ranging from 250 tons down to single carloads. That the market is likely to remain quiet during the remainder of the month is shown by the absence of inquiries. In fact, the only sizable pending transaction is 3500 tons of Northern and Southern foundry iron for a local consumer. Prices are unaltered, with southern Ohio foundry quoted at \$19, base Ironton; Tennessee and Alabama iron, at \$16, base Birmingham, and Jackson County silvery at \$25, base furnace, for 8 per cent. Northern Ohio makers are reported to be asking a minimum of \$16.50, base furnace.

Prices per gross ton, delivered Cincinnati:

| | |
|--------------------------------------|------------------|
| So. Ohio fdy., sil. 1.75 to 2.25.... | \$20.89 |
| So. Ohio malleable..... | \$20.14 to 20.89 |
| Alabama fdy., sil. 1.75 to 2.25.... | 19.69 |
| Alabama fdy., sil. 2.25 to 2.75.... | 20.19 |
| Tennessee fdy., sil. 1.75 to 2.25.. | 19.69 |
| Southern Ohio silvery, 8 per cent | 26.89 |

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Lessened demand for finished steel products, as reflected in the decreased volume of specifications and orders, is having an effect on prices of sheets and common wire nails. In the sheet market, several small mills have attempted to stimulate buying by reducing quotations from \$2 to \$3 a ton and as a defensive measure larger producers have been compelled to follow suit. The result has been that galvanized stock is selling rather generally at 3.65c., base Pittsburgh, as against the former price of 3.75c. Blue annealed sheets are selling at 2c., base Pittsburgh, to large users, with small consumers paying \$2 a ton more, while automobile body sheets are quoted at 4c., base Pittsburgh. Black sheets range from 2.75c. to 2.85c., base Pittsburgh, with the intermediate price of 2.80c. quoted in many cases. Bookings of common wire nails have been only fair, and competition for second quarter business is intense. Some sales of nails have been made at \$2.50 a keg, base Ironton, but a considerable proportion of the orders is being taken on the basis of \$2.55 to \$2.60, base Pittsburgh. There has been no perceptible improvement in structural steel, movement of which is lagging. Bars, structural shapes

Warehouse Prices, f.o.b. Boston

| | Base per Lb. |
|---------------------------------------|-------------------|
| Plates | 3.365c. |
| Structural shapes— | |
| Angles and beams..... | 3.365c. |
| Tees | 3.365c. |
| Zees | 3.465c. |
| Soft steel bars and small shapes..... | 3.265c. |
| Flats, hot-rolled | 4.15c. |
| Reinforcing bars | 3.265c. to 3.54c. |
| Iron bars— | |
| Refined | 3.265c. |
| Best refined | 4.60c. |
| Norway, rounds | 6.60c. |
| Norway, squares and flats..... | 7.10c. |
| Spring steel— | |
| Open-hearth | 5.00c. to 10.00c. |
| Crucible | 12.00c. |
| Tire steel | 4.50c. to 4.75c. |
| Bands | 4.015c. to 5.00c. |
| Hoop steel | 5.50c. to 6.00c. |
| Cold rolled steel— | |
| Rounds and hexagons..... | *3.45c. to 5.45c. |
| Squares and flats..... | *3.95c. to 6.95c. |
| Toe calk steel..... | 6.00c. |
| Rivets, structural or boiler..... | 4.50c. |
| | Per Cent Off List |
| Machine bolts | 50 and 5 |
| Carriage bolts | 50 and 5 |
| Lag screws | 50 and 5 |
| Hot-pressed nuts | 50 and 5 |
| Cold-punched nuts | 50 and 5 |
| Stove bolts | 70 and 10 |

*Including quantity differentials.

Warehouse Prices, f.o.b. Cincinnati

| | Base per Lb. |
|--|-----------------------|
| Plates and structural shapes..... | 3.40c. |
| Bars, soft steel or iron..... | 3.30c. |
| New billet reinforcing bars..... | 3.15c. |
| Rail steel reinforcing bars..... | 3.00c. |
| Hoops | 4.00c. to 4.25c. |
| Bands | 3.95c. |
| Cold-finished rounds and hexagons..... | 3.85c. |
| Squares | 4.35c. |
| Black sheets (No. 24)..... | 4.05c. |
| Galvanized sheets (No. 24)..... | 4.90c. |
| Blue annealed sheets (No. 10)..... | 3.60c. |
| Structural rivets | 3.85c. |
| Small rivets | .65 per cent off list |
| No. 9 annealed wire, per 100 lb..... | \$3.00 |
| Common wire nails, base per keg..... | 2.95 |
| Cement coated nails, base 100 lb. keg..... | 2.95 |
| Chain, per 100 lb..... | 7.55 |
| | Net per 100 Ft. |
| Lap-welded steel boiler tubes, 2-in..... | \$18.00 |
| 4-in. | 38.00 |
| Seamless steel boiler tubes, 2-in..... | 19.00 |
| 4-in. | 39.00 |

and plates are quoted at 1.85c., base Pittsburgh, to contract users and at 1.90c. to small consumers. Sales of cold-rolled bars and strips have been holding up fairly well.

Reinforcing Bars.—New billet bars are quoted at 1.85c. to 1.90c., base Pittsburgh, and rail steel stock at 1.80c. to 1.85c., base mill.

Warehouse Business.—While several jobbers report that shipments out of warehouses are running about 15 per cent ahead of those in March, others have not participated in the increased volume of sales and therefore are somewhat disappointed at the total tonnage which they have booked since the first of the month. Prices are firm and unchanged.

Coke.—By-product foundry coke specifications continue to show a downward trend, although shipments are still in liberal volume. Several dealers report that sales of by-product domestic coke are larger than normal for April because of the low price in effect this month. Producers in this district are encountering competition in by-product foundry coke from Birmingham companies, which are naming delivered prices lower than those of companies at Indianapolis, Portsmouth and Ashland. This condition especially applies in southern Ohio and in southern Indiana.

Foundry coke prices per net ton, delivered Cincinnati: By-products coke, \$9.02; Wise County coke, \$7.09 to \$7.59; New River coke, \$9.09 to \$9.59. Freight rates, \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens.

Old Material.—Steel plants in this district are accepting contract shipments at a normal rate and also are buying small tonnages. However, they are willing to pay only the lowest prices. Many items on railroad lists which were closed last week are reported to have brought slightly less than in March. There is a fair demand for foundry grades, but blast furnace items are weak.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

| | |
|------------------------------|--------------------|
| Heavy melting steel..... | \$11.50 to \$12.00 |
| Scrap rails for melting..... | 11.75 to 12.25 |
| Loose sheet clippings..... | 8.50 to 9.00 |
| Bundled sheets..... | 9.50 to 10.00 |
| Cast iron borings..... | 8.00 to 8.50 |
| Machine shop turnings..... | 7.50 to 8.00 |
| No. 1 busheling..... | 10.00 to 10.50 |
| No. 2 busheling..... | 7.00 to 7.50 |
| Rails for rolling..... | 12.50 to 13.00 |
| No. 1 locomotive tires..... | 12.75 to 13.25 |
| No. 1 railroad wrought..... | 10.00 to 10.50 |
| Short rails..... | 15.75 to 16.25 |
| Cast iron carwheels..... | 12.25 to 12.75 |
| No. 1 machinery cast..... | 15.50 to 16.00 |
| No. 1 railroad cast..... | 13.00 to 13.50 |
| Burnt cast..... | 7.50 to 8.00 |
| Stove plate..... | 8.25 to 8.75 |
| Brake shoes..... | 9.50 to 10.25 |
| Railroad malleable..... | 12.00 to 12.50 |
| Agricultural malleable..... | 11.50 to 12.00 |

Britain Supplies More Than Half of World's Tin Plate Exports

WASHINGTON, April 17.—Estimating that six-tenths of the tin plate entering export markets of the world is of British origin, three-tenths of American manufacture and the remaining tenth predominantly of German origin, with small amounts from other countries, the iron and steel division of the Department of Commerce, has prepared detailed figures showing the export movement of this product during 1927, 1926 and 1925. Shipments from Great Britain during those years were 472,029 gross tons, 375,041 tons and 511,355 tons; from the United States, 253,890 tons; 250,782 tons and 161,383 tons, and from Germany, 29,116 tons; 19,513 tons and 10,033 tons, respectively.

In 1926, exports of tin plate from Great Britain were placed at 65.6 per cent of the total output of that country as against 66.7 per cent in 1925. The German exportation represented 19.8 per cent of production in 1926 and 11.2 per cent in 1925. American exportations were 14.1 per cent of the total product made in 1926 and 9.7 per cent in 1925. Production of tin plate in Great Britain was declared to be 571,200 tons in 1926 and 766,600 tons in 1925; in the United States, 1,782,306 tons and 1,657,794 tons, and in Germany, 89,637 tons and 98,788 tons, respectively. In France production for 1926 was fixed at 63,132 tons and in India for that year the estimate was 34,400 tons.

Buffalo

Steel Plant Operations Continue at About 85 Per Cent

BUFFALO, April 17.—Pig iron inquiry and sales have been very light, though the foundry melt is rising and shipping directions are good. Prices continue firm in the district at \$17 for No. 2 plain, 1.75 to 2.25 per cent silicon, and \$17.50 for malleable. The Eastern Malleable Iron Co. is seeking 1500 to 2500 tons of malleable. Most of the remaining inquiry is for carload lots.

Prices per gross ton, f.o.b. furnace:

| | |
|--|----------------|
| No. 2 plain fdy., sil. 1.75 to 2.25..... | \$17.00 |
| No. 2 foundry, sil. 2.25 to 2.75..... | 17.50 |
| No. 1X foundry, sil. 2.75 to 3.25..... | 18.50 |
| Malleable, sil. up to 2.25..... | 17.50 |
| Basic..... | 16.50 to 17.00 |
| Lake Superior charcoal..... | 27.28 |

Finished Iron and Steel.—Operations continue at about 85 per cent for most of the plants. Bars, shapes and plates are firm. Sheet business is good, but prices are weaker. On especially desirable tonnage, black and galvanized sheets have been shaded \$2 a ton. Considerable pipe business was taken following the notice of intention to increase the price and before the new price actually went into effect. Jobbers generally specified up to the limit of their allotment. Bolt and nut business is good. A local maker is running double turn and three shifts in some instances. The Rochester Gas & Electric Co. will erect a gas holder requiring 800 tons of reinforcing bars and a considerable tonnage of structural steel.

Old Material.—A reported purchase of 1000 tons of heavy melting steel is said to have been made at \$14.75. Mills are consuming large quantities of material. A local consumer expects soon to receive shipment of hydraulic bundles and flashings purchased in Detroit. Two boats are loaded, ready for the opening of navigation. This scrap, about 30,000 tons, was purchased from consumers.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

| Basic Open-Hearth Grades | |
|---|--------------------|
| No. 1 heavy melting steel..... | \$14.50 to \$15.00 |
| No. 2 heavy melting steel..... | 12.75 to 13.25 |
| Scrap rails..... | 13.75 to 14.25 |
| Hydraulic compressed sheets..... | 13.00 to 13.50 |
| Hand bundled sheets..... | 9.00 to 9.50 |
| Drop forge flashings..... | 12.00 to 12.50 |
| No. 1 busheling..... | 13.25 to 13.75 |
| Heavy steel axle turnings..... | 12.50 to 12.75 |
| Machine shop turnings..... | 8.25 to 8.75 |
| Acid Open-Hearth Grades | |
| Railroad knuckles and couplers..... | 15.50 to 16.00 |
| Railroad coil and leaf springs..... | 15.50 to 16.00 |
| Rolled steel wheels..... | 15.50 to 16.00 |
| Low phosphorus billet and bloom ends..... | 17.00 to 17.50 |
| Electric Furnace Grades | |
| Heavy steel axle turnings..... | 12.75 to 13.25 |
| Short shoveling steel turnings..... | 10.75 to 11.25 |
| Blast Furnace Grades | |
| Short shoveling steel turnings..... | 10.50 to 11.00 |
| Short mixed borings and turnings..... | 9.50 to 10.00 |
| Cast iron borings..... | 9.75 to 10.25 |
| No. 2 busheling..... | 9.00 to 9.50 |
| Rolling Mill Grades | |
| Steel car axles..... | 17.00 to 17.50 |
| Iron axles..... | 22.00 to 23.00 |
| No. 1 railroad wrought..... | 12.50 to 13.00 |
| Cupola Grades | |
| No. 1 machinery cast..... | 14.50 to 15.00 |
| Stove plate..... | 13.00 to 13.50 |
| Locomotive grate bars..... | 12.00 to 12.50 |
| Steel rails, 3 ft. and under..... | 16.50 to 17.00 |
| Cast iron carwheels..... | 13.00 to 13.50 |
| Malleable Grades | |
| Railroad..... | 15.00 to 15.25 |
| Agricultural..... | 15.00 to 15.25 |
| Industrial..... | 15.00 to 15.25 |

Warehouse Prices, f.o.b. Buffalo

| Base per Lb. | |
|--|--------|
| Plates and structural shapes..... | 3.40c. |
| Soft steel bars..... | 3.30c. |
| Reinforcing bars..... | 2.75c. |
| Cold-finished flats, squares and hexagons..... | 4.45c. |
| Rounds..... | 3.95c. |
| Cold-rolled strip steel..... | 5.85c. |
| Black sheets (No. 24)..... | 4.30c. |
| Galvanized sheets (No. 24)..... | 5.15c. |
| Blue annealed sheets (No. 10)..... | 3.80c. |
| Common wire nails, base per keg..... | \$3.65 |
| Black wire, base per 100 lb..... | 3.90 |

NON-FERROUS METAL MARKETS

| The Week's Prices | | Apr. 17 | Apr. 16 | Apr. 14 | Apr. 13 | Apr. 12 | Apr. 11 |
|-------------------------|-------------------------------|---------|---------|---------|---------|---------|---------|
| | Lake copper, New York..... | 14.25 | 14.25 | 14.25 | 14.25 | 14.25 | 14.25 |
| | Electrolytic copper, N. Y.*.. | 14.12½ | 14.12½ | 14.12½ | 14.12½ | 14.12½ | 14.12½ |
| | Straits tin, spot, N. Y. | 52.75 | 52.00 | 51.62½ | 51.62½ | 51.62½ | 52.00 |
| | Lead, New York..... | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 | 6.10 |
| | Lead, St. Louis..... | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 |
| | Zinc, New York..... | 6.10 | 6.07½ | 6.07½ | 6.07½ | 6.07½ | 6.07½ |
| | Zinc, St. Louis..... | 5.75 | 5.72½ | 5.72½ | 5.72½ | 5.72½ | 5.72½ |

Cents per Pound
for
Early Delivery

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, April 17.—Tin is the only market that is at all active, and a good business has been done at slightly lower prices. Very little buying of copper is noted, but quotations are firm. Lead and zinc are also inactive at practically unchanged prices.

Copper.—Another week of very light business is recorded in electrolytic copper. There is almost no domestic demand, but there has been fair buying for export. Leading producers continue to maintain firmly quotations at 14.25c., delivered in the Connecticut Valley. From one or two sources less than carload lots can be bought at slight concessions; the lowest level reported is 14.17½c., delivered. It is believed that domestic consumers must still buy considerable metal for May and that foreign buyers must contract for considerable copper for both April and May. Because of this some expect another buying movement in the near future. Copper statistics for March are not particularly impressive, showing only a slight increase in refined stocks but a loss in output at the mine as compared with February's figures. Lake copper is not particularly active, but is steady at 14.25c., delivered. A good business has been done.

Tin.—Sales for the week ended Saturday, April 14, were between 1400 and 1500 tons, consisting principally of transactions among dealers, although some was bought by consumers, who are showing more interest. It is believed that the latter have considerable to buy for May and June. It is stated that supplies are none too plentiful. There was some pressure to sell

prompt tin last week by dealers, with the result that it fell into strong hands, rendering the price for that delivery very firm, with some possibility of a premium developing. The principal interest now is in May delivery and a feature is the heavy consumption. About 400 tons changed hands yesterday, Monday, and today the market was moderately active in spot and nearby, with spot Straits tin quoted at 52.75c., New York. Prices in London today were about the same as those of a week ago, with spot standard quoted at £234 17s. 6d., future standard at £235 10s. and spot Straits at £239 7s. 6d. The Singapore price today was £237 15s. Arrivals thus far this month have been 4295 tons, with 5585 tons reported afloat.

Lead.—Demand is very light, which is to be expected after the heavy buying in March and early April. A fair business is being done each day, however. The leading interest continues to quote 6.10c., New York, as its contract price, and in the outside market the quotation is very firm at 6.10c., St. Louis.

Zinc.—Conditions and prices have changed little during the week. There is no anxiety on the part of producers to sell, and consumers are well covered for their nearby requirements of prime Western zinc. Quotations have been practically unchanged at 5.72½c., St. Louis, or 6.07½c., New York. Sales of ore last week at Joplin were the largest in a long time at close to 21,000 tons, with production approximating 10,000 tons. The price is unchanged at \$38 per ton. Statistics for March showed that stocks of zinc increased only 239 tons over February's. Production and deliveries, however, were larger than in the preceding month, and there were more retorts active at the end of March.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c., with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Metals from New York Warehouse

Delivered Prices Per Lb.

| | |
|---|--------------------|
| Tin, Straits pig..... | 54.50c. to 55.50c. |
| Tin, bar | 57.00c. to 58.00c. |
| Copper, Lake | 15.25c. |
| Copper, electrolytic | 15.00c. |
| Copper, casting | 14.25c. |
| Zinc, slab..... | 6.75c. to 7.25c. |
| Lead, American pig..... | 7.00c. to 7.50c. |
| Lead, bar | 9.25c. to 10.25c. |
| Antimony, Asiatic | 12.00c. to 12.50c. |
| Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure)..... | 25.00c. to 26.00c. |
| Aluminum ingots, No. 12 alloy..... | 24.00c. to 25.00c. |
| Babbitt metal, commercial grade..... | 30.00c. to 40.00c. |
| Solder, ½ and ½..... | 34.00c. to 35.00c. |

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

| | |
|----------------------------------|---------|
| Tin, Straits pig | 59.00c. |
| Tin, bar | 61.00c. |
| Copper, Lake | 14.85c. |
| Copper, electrolytic | 14.85c. |
| Copper, casting | 14.00c. |
| Zinc, slab..... | 7.50c. |
| Lead, American pig | 6.95c. |
| Antimony, Asiatic | 16.00c. |
| Lead, bar | 9.25c. |
| Babbitt metal, medium grade..... | 19.75c. |
| Babbitt metal, high grade..... | 63.00c. |
| Solder, ½ and ½..... | 34.00c. |

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

| | |
|--|----------------------|
| Sheets— | |
| High brass | 18.50c. to 19.25c. |
| Copper, hot rolled | 23.00c. to 24.00c. |
| Copper, cold rolled, 14 oz. and heavier, | 25.50c. to 26.50c. |
| Seamless Tubes— | |
| Brass | 23.37½c. to 24.37½c. |
| Copper | 24.50c. to 25.50c. |
| Brazed Brass Tubes..... | 26.50c. to 27.50c. |
| Brass Rods | 16.25c. to 17.25c. |

From New York Warehouse

Delivered Prices, Base Per Lb.

| | |
|---------------------------------|--------------------|
| Zinc sheets (No. 9), casks..... | 9.50c. to 10.00c. |
| Zinc sheets, open..... | 10.50c. to 11.00c. |

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not changed. Quotations on lead full sheets and zinc sheets have not been revised since the reductions of Feb. 21 and March 26 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

| | |
|---------------------------|-------------------|
| Sheets— | |
| High brass | 18.75c. |
| Copper, hot rolled | 23.00c. |
| Zinc | 8.50c. |
| Lead (full sheets) | 9.75c. to 10.00c. |
| Seamless Tubes— | |
| High brass | 23.62½c. |
| Copper | 24.50c. |
| Rods— | |
| High brass | 16.50c. |
| Naval brass | 19.25c. |
| Wire— | |
| Copper | 16.00c. |
| High brass | 19.25c. |
| Copper in Rolls..... | 22.00c. |
| Brazed Brass Tubing | 26.75c. |

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

| | |
|---|---------|
| Sheets, 0 to 10 gage, 3 to 30 in. wide..... | 33.00c. |
| Tubes, base | 42.00c. |
| Machine rods | 34.00c. |

Rolled Metals, f.o.b. Chicago Warehouse (Prices Cover Trucking to Consumers' Doors in City Limits)

| Sheets— | Base per Lb. |
|---|--------------|
| High brass | 18.75c. |
| Copper, hot rolled | 22.75c. |
| Copper, cold rolled, 14 oz. and heavier | 25.00c. |
| Zinc | 10.00c. |
| Lead, wide | 9.75c. |
| Seamless Tubes— | |
| Brass | 25.12½c. |
| Copper | 26.00c. |
| Brazed Brass Tubes | 26.75c. |
| Brass Rods | 16.50c. |

Antimony.—Fairly heavy sales have been made lately, and the market is stronger, with Chinese metal for all positions quoted at 10.25c. per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, April 17.—Sales of non-ferrous metals in this district are in small volume. Prices are steady except for tin and zinc. Buyers are showing little interest in the old metal market.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 53.50c.; lead, 6.15c.; zinc, 5.90c.; in less-than-carload lots, antimony, 11.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

Two Drainage Projects Take 10,250 Tons— Awards Total 16,700 Tons

A SEWER project at Stickney, Ill., taking 5000 tons, and a drainage improvement job at Los Angeles, calling for 5250 tons, brought the week's awards to 16,700 tons, one of the highest figures of the year. New pending work amounting to 5100 tons included 1000 tons for a factory building at Chicago and 1220 tons for another drainage improvement job at Los Angeles. Awards follow:

BOSTON, 600 tons, loft building, to Concrete Steel Co.
WESTCHESTER COUNTY, N. Y., 100 tons, road work: from Christopher Brothers, general contractors, to Concrete Steel Co.
NEW YORK, 400 tons, section of subway: from Corson Construction Co., general contractor, to Truscon Steel Co.
OAK PARK, ILL., 200 tons of rail steel bars, Fair Oakes Garage, to unnamed bidder.
CLEVELAND, 100 tons, laboratory for Cleveland Clinic, to Patterson Leitch Co.
CHICAGO, 650 tons, office building at Van Buren Street and West Jackson Boulevard, to Kalman Steel Co.
CHICAGO, 100 tons, addition to Michael Reese Hospital, to Kalman Steel Co.
CHICAGO, 1500 tons, addition to Soldier Field, to Olney J. Dean & Co.
CHICAGO, 500 tons, Woolworth Building, to unnamed bidder.
CHICAGO, 130 tons of rail steel bars, Edgewater Hospital, to Calumet Steel Co.
STICKNEY, ILL., 5000 tons, extension to a former sewer contract, to Olney J. Dean & Co.
MILWAUKEE, 300 tons, building for Sears, Roebuck & Co., to American System of Reinforcing.
ST. LOUIS, 300 tons, apartment house at 3745 Lindell Boulevard, to Laclede Steel Co.
ST. LOUIS, 100 tons, apartment house at Delmar Boulevard and Westgate Avenue, to Missouri Rolling Mills Corporation.
SAN FRANCISCO, 212 tons, paving work near French Camp, to unnamed bidder.
BERKELEY, CAL., 100 tons, warehouse on Shattuck Avenue, to Gunn, Carle & Co.
SEATTLE, 420 tons, warehouse for William Volker & Co., to Northwest Steel Rolling Mills.
SEATTLE, 240 tons, Transportation Building, to Northwest Steel Rolling Mills.
SEATTLE, 100 tons, Fairview School, to Pacific Coast Steel Co.
PULLMAN, WASH., 100 tons, home economics building for Washington State University, to Pacific Coast Steel Co.
WALLA WALLA, WASH., 100 tons, sewage disposal plant, to Truscon Steel Co.
EUGENE, ORE., 100 tons, machine shops for Southern Pacific Co., to Mercer Steel Co.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

| | Dealers' Buying Prices | Dealers' Selling Prices |
|---|------------------------------|-------------------------------|
| Copper, heavy crucible | 12.00c. | 13.50c. |
| Copper, heavy and wire | 11.75c. | 12.875c. |
| Copper, light and bottoms | 10.00c. | 11.25c. |
| Brass, heavy | 7.00c. | 8.50c. |
| Brass, light | 6.00c. | 7.50c. |
| Heavy machine composition | 9.50c. | 10.625c. |
| No. 1 yellow brass turnings | 7.75c. | 9.00c. |
| No. 1 red brass or composition turnings | 8.75c. | 9.75c. |
| Lead, heavy | 5.00c. | 5.50c. |
| Lead, tea | 4.00c. | 4.50c. |
| Zinc | 3.00c. | 3.50c. |
| Sheet aluminum | 12.50c. | 14.50c. |
| Cast aluminum | 12.50c. | 14.00c. |

PHOENIX, ARIZ., 263 tons, paving work between Globe and Safford, to unnamed bidder.

LOS ANGELES, 5257 tons, Drainage Improvement District No. 23 to unnamed bidder; general contract to Will F. Peck, Los Angeles.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW BRUNSWICK, N. J., 1700 tons, highway bridge over Raritan River; general contract to Parker & Graham, Inc., Paterson, N. J.
CROWN POINT, N. Y., 450 tons of bars and 200 tons of mesh for Lake Champlain bridge.
ROCHESTER, N. Y., 800 tons, gas holder for Rochester Gas & Electric Co.
CHICAGO, 1000 tons, factory building, Scott Joy, architect.
CHICAGO, 100 tons, warehouse for R. C. Wieboldt & Co.
CHICAGO, 200 tons, garage, Rissman & Herschfield, architects.
CHICAGO, 400 tons, building for Nu-Art Engraving Co., Austin Co., general contractor.
AURORA, ILL., 350 tons, reservoir, Cope & Fisher, Decatur, Ill., low bidders on general contract.
CHICAGO, 250 tons, Austin High School, Harvey A. Hanson Construction Co., general contractor.
CHICAGO, 500 tons, Sholem Temple.
LOS ANGELES, 1220 tons, Drainage Improvement District No. 22, Torson Construction Co., Long Beach, low bidder.

RAILROAD EQUIPMENT

Southern Pacific Inquires for 550 Additional Freight Cars—200 Phosphate Cars Bought

THE Southern Pacific has doubled its original inquiry for 500 flat cars and 50 gondolas. Other fresh inquiries include 500 steel box car underframes for the Chicago, Rock Island & Pacific and 250 bodies for the St. Louis-San Francisco. The Atlantic Coast Line has purchased 200 phosphate cars. Inquiries for more than 100 passenger cars by several railroads also featured the week's business, details of which follow:

Atlantic Coast Line has ordered 200 phosphate cars from Tennessee Coal, Iron & Railroad Co.

New York, New Haven & Hartford is inquiring for 50 to 100 steel underframes for passenger cars.

Western Maryland has placed orders for miscellaneous plates and shapes for reconditioning approximately 500 hopper cars.

Northern Pacific has ordered 50 caboose car underframes from Pacific Car & Foundry Co.

Standard Oil Co. of New Jersey has ordered six 50-ton steel box cars from Pressed Steel Car Co.

Baltimore & Ohio will purchase 10 combination baggage and mail cars.

Chicago, South Shore & South Bend will buy 15 motor cars and five trailers.

Chicago, Rock Island & Pacific will purchase 500 box car underframes for cars to be built in its Armourdale, Kan., shops.

Chicago & North Western has ordered five motor car bodies from Pullman Car & Mfg. Corporation.

Union Pacific has ordered four motor car bodies from Pullman Car & Mfg. Corporation.

St. Louis-San Francisco will purchase 250 car bodies. Cleveland, Cincinnati, Chicago & St. Louis will buy 40 passenger cars.

Southern Pacific will purchase 500 flat cars and 50 gondola cars, in addition to like numbers on which prices were recently asked. This railroad is also in the market for 25 coaches, five compartment coaches, 10 baggage and 6 baggage-postal cars.

FABRICATED STRUCTURAL STEEL

Highway Bridge at Charleston, S. C., Will Take 12,000 Tons—Awards of 35,450 Tons

WITH a highway bridge over the Cooper River at Charleston, S. C., which will take 12,000 tons and a bridge across Lake Champlain at Crown Point, N. Y., requiring 3000 tons, new projects brought out during the week totaled 40,800 tons. Awards amounted to 35,450 tons, the largest 6000 tons for a bridge approach at St. Louis and 5000 tons for a section of the subway in New York. Awards follow:

SOUTH BOSTON, 200 tons, New York, New Haven & Hartford Railroad freight shed, to New England Structural Co.
 BOSTON, 114 tons, bridge, Brighton district, Boston & Albany Railroad, to Boston Bridge Works, Inc.
 AYER, MASS., 850 tons, transmission towers for New England Power Construction Co., to American Bridge Co.
 BANGOR & ARCOSTOOK RAILROAD, 315 tons, bridge at Monticello, Me., to an unnamed fabricator.
 NEW YORK, 5000 tons, section 2, route 109, of subway; from Rodgers & Hagerty, Inc., general contractor, to American Bridge Co.
 NEW YORK, 4400 tons, Governor Clinton Hotel, Seventh Avenue and Thirty-first Street, to Hedden Iron Construction Co.
 NEW YORK, 1000 tons, Waterside Tie Station for New York Edison Co., to Levering & Garrigues Co.
 LIVERPOOL, N. Y., 200 tons, high school, to Union Structural Steel Co.
 HARRISON, N. J., 950 tons, building for Otis Elevator Co., to Shoemaker Bridge Co.
 CENTRAL RAILROAD OF NEW JERSEY, 160 tons, bridge at Scranton, Pa., to American Bridge Co.
 PHILADELPHIA, 150 tons, building for Philadelphia Electric Co., to Belmont Iron Works.
 HOT SPRINGS, VA., 450 tons, hotel, to American Bridge Co.
 SOUTHERN RAILWAY, 730 tons; 550 tons for viaduct at Clouds, Tenn., and 180 tons for miscellaneous bridges, to Virginia Bridge & Iron Co.
 BUFFALO, 155 tons Junior beams for Dupont Rayon Co. building, to Jones & Laughlin Steel Corporation.
 LOCK HAVEN, PA., 150 tons Junior beams for Lock Haven High School, to Jones & Laughlin Steel Corporation.
 BUTLER, PA., 3500 tons, mill extension, American Rolling Mill Co., to McClintic-Marshall Co.
 NEW CASTLE, PA., 110 tons, Weingartner Realty Co. garage, to American Bridge Co.
 CLEVELAND, 1200 tons, two bridges for Cleveland Union Terminals Co., to Fort Pitt Bridge Works.
 CLEVELAND, 112 tons, Fairview Village high school, to Wellman-Seaver-Morgan Co.
 DAYTON, OHIO, 400 tons, Dayton-Biltmore Hotel, to American Bridge Co.
 NEWARK, OHIO, 160 tons, Midland Theater, to Massillon Bridge & Structural Co.
 MIDDLETOWN, OHIO, 400 tons, gas producer building and extension to open-hearth building American Rolling Mill Co., to Jones & Laughlin Steel Corporation.
 NEW ORLEANS, 3100 tons, wharf sheds, to Lukens Steel Co.
 APPLETON, WIS., 350 tons, building for Consolidated Water Power & Paper Co., to Wisconsin Bridge & Iron Co.
 WISCONSIN RAPIDS, WIS., 550 tons, digester house and warehouse for Consolidated Water Power & Paper Co., to Wisconsin Bridge & Iron Co.
 MARINETTE, WIS., 200 tons, interstate bridge, to Wisconsin Bridge & Iron Co.
 CHICAGO, 1100 tons, building for Chicago Motor Club, to Gage Structural Steel Co., local; previously reported to American Bridge Co.
 CHICAGO, 100 tons, power plant for Chicago, Burlington & Quincy Railroad, to Midland Structural Steel Co., local.
 CHICAGO, 275 tons, addition to Sheridan Trust & Savings Bank Building, to Worden-Allen Co.
 DAVENPORT, IOWA, 500 tons, Rock Island Railroad bridge, to Fort Pitt Bridge Works.
 DES MOINES, IOWA, 700 tons, court building, to Des Moines Steel Co.
 ST. LOUIS, 6000 tons, southern approach to Free Bridge, to American Bridge Co.
 KANSAS CITY, MO., 1400 tons, building for Sheffield Steel Corporation, to Kansas City Structural Steel Co.
 OAKLAND, CAL., 250 tons, hangars for Port Commission, to Moore Dry Dock Co.
 REDWOOD CITY, CAL., 125 tons, theater, to Golden Gate Iron Works.
 PITTSBURG, CAL., 376 tons, factory for Johns-Manville Co., to Dyer Brothers.
 PITTSBURGH, 511 tons, National Biscuit Co. building, to Fort Pitt Bridge Works.

LOS ANGELES, 150 tons, structural steel for city work, to McClintic-Marshall Co.

SAN DIEGO, CAL., 165 tons, cotton warehouse, to National Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 400 tons, apartment house on Newbury Street.
 BOSTON, 150 tons, Thompson Spa building on Summer Street.
 MIDDLETOWN, N. H., 227 tons, two bridges.
 STATE OF NEW HAMPSHIRE, 145 tons, bridges at Bethlehem, Lisbon and Wentworth.
 MAINE CENTRAL RAILROAD, 325 tons, bridges.
 CROWN POINT, N. Y., 3000 tons, bridge over Lake Champlain from Crown Point to Chimney Point, Vt.; bids early in May.
 STATE OF NEW YORK, 200 tons, highway bridge.
 JAMAICA, N. Y., 400 tons, building for Cox Baking Co.
 ROCHESTER, N. Y., 1000 tons, Benjamin Franklin High School, to F. L. Heughes & Co.
 STATE OF NEW JERSEY, 160 tons, highway bridge near Flemington.
 WEST END, N. J., 900 tons, H. T. Parson residence; bids in.
 LEHIGH VALLEY RAILROAD, 950 tons, bridge at Newark, N. J.
 PHILADELPHIA 1400 tons, apartment building on Spruce Street; bids in.
 PHILADELPHIA, 1000 tons, building for Jefferson Medical College; bids in.
 SUNBURY, PA., 1600 tons, bridge over Susquehanna River.
 BALTIMORE & OHIO RAILROAD, 1900 tons, bridges.
 CHARLESTON, W. VA., 1800 tons, Kanawha Valley Bank; bids in.
 CHARLESTON, S. C., 12,000 tons, Cooper River bridge; bids in.
 NEWARK, DEL., 153 tons, engineering building for University of Delaware, general contractor Northeast Construction Co.
 PHILADELPHIA, 900 tons, apartment building at Fifteenth and Spruce Streets, general contractor Foundation Co.
 CLEVELAND, 1200 tons, Lake Shore Hotel.
 CLEVELAND, 350 tons, Y. M. C. A. technical schools.
 MADISON, WIS., 135 tons, overhead bridge on Janesville-Stoughton-Madison State trunk highway; bids close April 25.
 STATE OF ILLINOIS, 900 tons, highway bridges; A. C. Wood, Rockford, Ill., low bidder on five bridges; Hansell-Elcock, Chicago, low bidder on one bridge, and Continental Bridge Co., Chicago, low bidder on two bridges.
 CHICAGO, 2000 tons, reconstruction of Fine Arts Building, Jackson Park; Graham, Anderson, Probst & White, architects.
 CHICAGO, 700 tons, building for Crane Co.; Graham, Anderson, Probst & White, architects.
 CHICAGO, 1700 tons, bridge for Baltimore & Ohio.
 MINNEAPOLIS, 1100 tons, office building for Northern States Power Co.
 ST. JOSEPH, MO., 2100 tons, bridge across Missouri River.
 DENVER, COLO., 445 tons, siphons for Kittitas Canal project, Yakima, Wash.; Pittsburgh-Des Moines Steel Co., low bidder.
 SHREVEPORT, LA., 300 tons, overhead crossing for Kansas City Southern Railroad.
 NEW ORLEANS, 1000 tons, coffee sheds.
 MCGILL, NEV., 600 tons, building at Kimberly mine.
 MONTEREY, MEX., 370 tons, building for American Smelting & Refining Co.
 SACRAMENTO, CAL., 600 tons, bridge over Smith River, Del Norte County; Park Schramm Co., Portland, low bidder on general contract.
 SAN FRANCISCO, 100 tons, addition to store, 1041 Market Street; bids being taken.
 RIVERSIDE, CAL., 300 tons, Riverside Drive crossing over Pacific Electric Co. tracks; bids being taken by Pacific Electric Co., Los Angeles.
 LOS ANGELES, 685 tons, I beams for city; bids April 23.
 CHEHALIS, WASH., 100 tons, bridge over Chehalis River for Grays Harbor County; Car Bjork, low bidder.
 OLYMPIA, WASH., 220 tons, bridge over McKenzie River near Coburg; bids April 20.
 KETTLE FALLS, WASH., 1100 tons, bridge.

The Bank of Pittsburgh has been appointed receiver of the Consolidated Coke Co., Pittsburgh, upon petition of the National Transportation Co., to which the Coke company is indebted in the sum of \$16,438. The Marine Trust Co., Buffalo, has entered suit against the company for payment of a note for \$9,000. Assets of the company are given as \$2,000,000, subject to mortgage indebtedness of \$586,000, while accounts payable amount to \$211,266. The receivership, it is believed, will obviate the possibility of forced liquidation of the company.

PERSONAL

H. D. Savage, for many years vice-president of the Combustion Engineering Corporation, 200 Madison Avenue, New York, has been elected president of the company, succeeding Joseph V. Santry, who has resigned. George T. Ladd, who has been prominently identified with the Combustion company and other subsidiaries of the International Combustion Engineer-



H. D. SAVAGE



G. T. LADD

ing Corporation, has been elected vice-chairman of the board of the Combustion Engineering Corporation. Before entering the pulverized fuel field Mr. Savage was head of the Ashland Fire Brick Co., Ashland, Ky., and participated in the organization of and served as first president of the Refractory Manufacturers' Association. In 1914 he became president of the American Arch Co., and two years later, went with the Locomotive Pulverized Fuel Co. as vice-president. When the Combustion Engineering Corporation purchased the Lopulco Pulverized Fuel Systems in 1920, Mr. Savage became associated with the former company as directing head of the pulverized fuel division. He holds offices in a number of the other subsidiaries of the International company and is a member of numerous technical societies and clubs. Mr. Ladd, who is president of the Ladd Water Tube Boiler Co. and the Heine Boiler Co., has for many years been identified with the manufacture and installation of steam boilers.

James A. Farrell, president of the United States Steel Corporation, will sail Saturday on the Conte Grande for a stay of several weeks in Europe.

H. B. Hazerodt has resigned as manager of the Detroit branch of the Black & Decker Mfg. Co., Towson, Md., and has been succeeded by J. H. Walker, who has been in the company's Detroit sales organization for the last five years. The company has just removed its offices and showroom in that city to 11501 Woodward Avenue. H. L. Balke is now associated with the company's Kansas City, Mo., branch, succeeding S. D. Shawgo in the territory around Omaha, Neb. G. F. Parr has taken the place of J. H. Hutton in the Buffalo territory and G. N. McCarthy has succeeded H. B. Austin in the same office, Mr. Austin having been transferred to Chicago. J. A. Murray is now associated with the Baltimore office, succeeding Curtiss Watts.

J. E. Mullen, formerly assistant sales manager of the R. D. Nuttall Co., Pittsburgh, has been placed in charge of the company's commercial activities which are now being handled through the Westinghouse Electric & Mfg. Co., of which the Nuttall company is a

subsidiary. Mr. Mullen's headquarters will be at the Nuttall plant, McCandless Avenue and Butler Street, Pittsburgh.

M. S. Sternberg has been appointed general superintendent of the Hubbard Steel Foundry Co., East Chicago, Ind., succeeding the late Robert W. Freeland. H. A. Forsberg, formerly production engineer for that company, has been made assistant general superintendent.

William C. Hays, formerly vice-president and a director of J. K. Larkin & Co., Inc., New York, has formed the Hays Steel & Wire Corporation, with offices and warehouse at Metropolitan and Woodward Avenues, Brooklyn. The company will distribute general steel products, including bars, shapes, bands, plates, nails, wire, sheets and bolts.

Irving C. Bolton, treasurer Warner & Swasey Co., Cleveland, has been elected a director of the Cleveland Chamber of Commerce. Among the other new directors are L. R. Scafe, treasurer and general manager Fisher Body Ohio Corporation, and A. S. Rodgers, president White Sewing Machine Corporation.

Walter E. Foster, who has been in the Bridgeport, Conn., office of the Reading Steel Casting Co., has been transferred to the Chicago office and made sales manager of the company.

Edward P. Geary has been appointed district sales manager of a sales office recently opened at 375 Ellicott Square, Buffalo, by the Colonial Steel Co., Pittsburgh. L. O. Burrell and J. S. Smith are also associated with the office, the territory of which includes Erie, Pa., western New York State and Ontario, Canada.

E. H. Gartrell was elected president and general manager of the Ashland Fire Brick Co., Ashland, Ky., at a recent meeting of directors. John Russell was named vice-president and E. M. Weinfurter, secretary and treasurer.

A. M. Branum, formerly in the Chicago office of the Jones & Laughlin Steel Corporation and for a time with Joseph T. Ryerson & Son, Inc., Chicago, has joined the Chicago sales organization of the Bethlehem Steel Co.

Frederick A. Westphal, since 1922 assistant superintendent of the rod and wire department at the Aliquippa works, Jones & Laughlin Steel Corporation, Pittsburgh, resigned March 15 and has been appointed superintendent of the wire department now under construction by the Sheffield Steel Corporation, Kansas City, Mo. He was graduated from the United States Naval Academy in 1916 and soon became associated with the American Steel & Wire Co., first as foreman at its Worcester, Mass., plant and later as wire rope engineer in the New York office. With the exception of two years as a field artillery officer with the First Division, American Expeditionary Forces, he remained with the Steel & Wire company until his association with the Jones & Laughlin company in 1922.

Arthur R. Adelberg, recently district sales manager at Philadelphia for the Cyclops Steel Co., Titusville, Pa., and the Universal Steel Co., Bridgeville, Pa., has resigned to become associated with the Duraloy Co., Pittsburgh. He will specialize in the sale of chrome iron and other noncorrosive and heat resisting castings and rolled products, with headquarters at the company's Eastern sales offices, 136 Liberty Street, New York.

A. N. Bakhtiarov, chief engineer of the Yurt, or Soviet Southern Ore Trust, accompanied by other officials of the organization, has arrived in the United States to make a three months' study of American production methods and mining equipment.

Nelson G. Craig has been appointed district sales manager at Philadelphia, with offices at 1420 Walnut Street, of the Oliver Iron & Steel Corporation, Pittsburgh. He was formerly associated with the Rumsey Electric Co., Philadelphia.

Charles T. Scott, formerly associated with Briggs & Turivas, Inc., and the Republic Rolling Mill Corporation, Chicago, has organized the Scott Steel Co., 110 South Dearborn Street, Chicago, to deal in iron and steel.

Prof. Franz A. Kartak, since 1921 head of the department of electrical engineering, Marquette University, Milwaukee, has been appointed dean of the college of engineering. He succeeds Frank C. French, dean since 1924, who is returning to his former home at Lake City, Colo. Professor Kartak received his bachelor of science degree in electrical engineering at the University of Wisconsin in 1909, and the degree of electrical engineer at Wisconsin in 1911. He went to Marquette from the School of Engineering of Milwaukee. Prof. William D. Bliss, head of the Marquette mechanical engineering department, has resigned to accept a similar position at Texas Agricultural and Mechanical College, College Station, Tex. Professor Bliss became associated with Marquette University in 1914 and will

remain until the close of the school year, assuming his new duties Sept. 1.

W. H. Bowden, Maytag Co., Newton, Iowa, spoke on April 16 at a meeting of the Quad-City Foundrymen's Association at the LeClaire Hotel, Moline, Ill.

Carl F. Scott, manager of building equipment sales, General Electric Co., Schenectady, N. Y., has been made assistant sales manager of the Gurney Elevator Co., New York. He is a graduate of Haverford College, Haverford, Pa., and has been with the General Electric Co. since 1908.

L. G. Bradley, well known in the machinery business in the Detroit district, has just returned from a trip to England as the American representative for the purchase of machinery of Alfred Herbert, Ltd., Coventry, England, and established offices in the Boyer Building, Detroit.

Thomas J. Bray, Jr., has been appointed assistant general superintendent Republic Iron & Steel Co., Youngstown, Ohio, succeeding Caleb Davies, Jr., who resigned recently to become vice-president American Tar Products Co., Pittsburgh.

T. J. Bray Resigns Republic Presidency

Thomas J. Bray, for 17 years president of the Republic Iron & Steel Co., Youngstown, has announced his resignation from that office and retirement from

active business, effective May 1. On that date he will be 61 years of age and will have completed 41 years of active association with the steel industry. During his identification with the Republic company it has expanded from a producer of rolled iron products to one of the country's largest independent steel producers and since he has been chief executive, the company has built two blast furnaces, the entire open-hearth plant, the by-product coke ovens and the tube works.

Mr. Bray was born at Pittsburgh and attended the public schools in that city. His first work was



THOMAS J. BRAY

as an apprentice in pattern making with the Lewis Foundry & Machine Co., Pittsburgh, at which he was engaged from 1883 until 1886. During the next four years he became chief draftsman of this company and was also identified with the Riverside Iron Works, Benwood, W. Va., later the Riverside works of the National Tube Co., a plant designed and built by his father and of which the elder Mr. Bray was for a time superintendent.

In 1890 the younger Mr. Bray left the Lewis company to enter Lehigh University, and four years later was graduated from that institution with the degree of mechanical engineer. Upon leaving college he went with the Ohio Steel Co., Youngstown, now the Ohio works of the Carnegie Steel Co., but severed that connection a few years later to become associated with McGill & Co., Pittsburgh. He was secretary and mechanical engineer of that company in 1901 when it became a part of the United Engineering & Foundry Co. and remained with the latter company for the next five years as chief engineer.

Upon going with the Republic company in 1906 he was assistant to the president and a short time later became vice-president in charge of operations. He was elected president of the company in April, 1911.

Mr. Bray is a member of the American Iron and Steel Institute, the (British) Iron and Steel Institute and the American Society of Mechanical Engineers. He is a director of the Dollar Savings & Trust Co., Youngstown, and of a number of other financial and industrial organizations.

Honor Edgar C. Felton

Edgar C. Felton was tendered a testimonial dinner at the University Club in New York, April 14, by fellow workers in the one-time Pennsylvania Steel Co., of which he was president when it became a part of the Bethlehem Steel Co. The dinner was in commemoration of his arriving at the age of 70 years and proved not only a personal tribute to Mr. Felton but an indication of the notable esprit de corps of the organization of which Mr. Felton was the head.

John C. Jay, who was vice-president and general manager of sales of the company when it was merged into the Bethlehem company, organized the dinner, which was attended by no less than 80 men, some of whom had come a considerable distance. R. W. Gillispie was toastmaster, and among those who spoke were W. H. Donner, now head of the Donner Steel Co.; Frederick W. Wood, formerly president of the Maryland Steel Co., which was a part of the Pennsylvania Steel property; J. V. W. Reynders, now a consulting engineer in New York; Frank A. Robbins, Jr., now general superintendent of the Steelton works of the Bethlehem Steel Co., as the Pennsylvania Steel plant is now known, and Charles S. Clark, who represented the company in Boston for many years. Among those present also were John B. Downes, formerly superintendent of the Steelton rail mill and now 80 years of age, and F. W. Cram, ex-president of the Bangor & Aroostook Railroad. The messages received included a cablegram from Thomas Blagden, Jr., from Sydney, Australia, where he represents the White Motor Co.

A huge birthday cake with 70 candles, carried in by four chefs, was a feature of the dinner. Mr. Felton was presented with a silver box in commemoration of the event.

The V. E. Montgomery Co., 408 First National Bank Building, Cincinnati, pig iron and coke dealer, has been appointed exclusive sales agent in the Central, North Central and Western States for the foundry and furnace beehive coke manufactured by the Wise Coal & Coke Co., Dorchester Junction, Va.

OBITUARY

HARMON W. HENDRICKS, president of Hendricks Brothers, Inc., 49 Cliff Street, New York, who died at his home in that city on March 31, had been identified with the manufacture of copper and sale of non-ferrous metals for more than 50 years. He was in his eighty-third year and was the last of three brothers to be associated with the firm which had conducted business in this country for 125 years. The company operates copper rolling mills at Soho, N. J., and also the Belleville Copper Rolling Mills, Belleville, N. J., which have been in continuous operation since 1816. The firm also conducts a jobbing business in non-ferrous products of all kinds.

ROBERT J. HANNA, treasurer Weirton Steel Co., Weirton, W. Va., died at the Homeopathic Hospital, Pittsburgh, April 9, following an operation. He was 45 years of age and had been identified with the Weirton company for nine years.

ROBERT C. GARRISON, superintendent of the Salem, Ohio, works of the American Steel & Wire Co., died April 11, aged 52 years. He had been in poor health for several months. Mr. Garrison's first employment with the Steel & Wire company was as a timekeeper in one of its Cleveland plants. In 1917, after various promotions, he was made assistant superintendent of the Consolidated works, Cleveland, and in the following year, assistant superintendent of the H. P. Works, Cleveland. He was appointed superintendent of the Salem plant in 1924.

A. L. BROOMALL, manager renewal parts engineering department, Westinghouse Electric & Mfg. Co., East Pittsburgh, died at his home in Wilkesburg, Pa., April 10. He was 44 years old, and had been identified with the Westinghouse company since his graduation from Lehigh University in 1906.

GEORGE J. SMILEY, sales manager in the Middle West for the Remington Arms Co., Inc., New York, died on April 12 at the Battle Creek Sanitarium, Battle Creek, Mich., following a week's illness. He was a brother of John B. Smiley, recently president of the Remington company.

WILLIAM W. SHARP, district sales manager at Akron, Ohio, for the Pierce, Butler & Pierce Mfg. Corporation, New York, died on April 9 at the Cleveland Clinic Hospital, Cleveland, following an illness of six months. He was 39 years of age and was president and general manager of the Mill & Mine Supply Co. and the Akron Warehouse Co., both of Akron, until those companies were absorbed by the Pierce, Butler & Pierce organization in August, 1926.

JOHN PENN BROCK, general manager of the Lebanon, Pa., plant of the Bethlehem Steel Co., died suddenly in Rome, Italy, on April 9, aged 48 years. He entered the service of the Pennsylvania Steel Co. in 1903 and filled various positions at Steelton. On Feb. 1, 1907, he went with the American Iron & Steel Mfg. Co. at Lebanon, and became its vice-president and general manager. Upon the acquisition of the company in 1917 by the Bethlehem Steel Co., he was appointed to the position of general manager of this and all the steel producing properties in Lebanon and Cornwall which now constitute the Lebanon plant. He was graduated from Yale University in 1900.

ELMER E. KIGER, for some years steam engineer of the Lackawanna plant of the Bethlehem Steel Co., died suddenly April 5 at Hamburg, N. Y. He was graduated from Cornell University in 1898.

HENRY W. KING, for years prominently identified with the structural steel fabricating industry in Cleveland as president of the King Bridge Co., which dis-

continued fabricating work a few years ago, died at his home in Kirtland Hills Village, a Cleveland suburb, April 14, aged 65 years.

A. W. GRANT, JR., for the last 12 years associated with the Koppers Co., Pittsburgh, died on April 5 at the Sewickley Valley Hospital, aged 41 years. He was graduated from Virginia Polytechnic Institute in 1907 and received his mechanical engineering degree from Cornell University in 1909. For the next two years he was engaged in steam engineering work for the Baldwin Locomotive Works, Philadelphia, and eastern steel companies. Before going with the Koppers Co. he was associated for five years with the United Gas Improvement Co., Philadelphia.

OTIS WILLIAMS, for some years associated with the Clark Machine Co., St. Johnsville, N. Y., died recently at St. Petersburg, Fla., aged 68 years. Before going with the Clark company he had been engaged in the manufacture of agricultural machinery.

R. J. DAVIS, formerly eastern operating manager of the American Bridge Co., with office in Philadelphia, died April 9, at his home in that city. He was 59 years of age and had been with the American Bridge Co. from 1902 until 1923, when he resigned to become manager of the structural steel shop of the New York Shipbuilding Corporation, Camden, N. J. He continued in that position under the American Brown Boveri Electric Corporation, the new owner of the shipyard, until the structural steel branch of the business was discontinued. For the past year Mr. Davis had been in failing health and had not been active.

Conference on Warehouse Distribution

(Concluded from page 1089)

pipe; copper sheets; electrical equipment; fence wire, poultry netting and reinforcing mesh; files; fire extinguishers; granite ware; hacksaw blades and saws, hand and crosscut saws; hoes and handled implements; horse nails; horse shoes; hose, rubber; insulating and plaster board; lawn mowers; lead pipe; leather belting; machine tools; manila rope; milling cutters; paint, linseed oil and white lead; pipe and tubing (iron and steel); plow goods (fitted plow lays, cultivator shovels, etc.); rubber belting, sandpaper, emery cloth and emery wheels; set and cap screws; shovels; silverware; small rivets; steel sheets, including galvanized and roofing products; stove bolts; taps and dies; tin plate; tools—mechanics' and machinists'; tool steel; twist drills and reamers; valves and fittings; vises; washers; wheel goods; window glass and glassware; wire fence; wire nails; wire rope; wire screen; wood and machine screws.

"The discussion will not be limited to the distribution plan of the bolt, nut and rivet industry, but will be open for any constructive suggestions pertaining to the selling and distribution problem.

"If the meeting is called and proves successful, consideration should be given by each industry to the appointment of one man as its representative on a national committee to carry on the work with the jobbers' chairmen.

"Should such a committee of manufacturers be appointed, there would be a condition whereby 34 jobbing executives and approximately 35 manufacturing executives would represent the leading industrial and jobbing interests of the United States, covering the hardware and mill supply lines.

"Should this proposal meet with the universal approval of our manufacturing interests, this meeting would bring together the most representative gathering of executives in the history of American business, and would create an opportunity to put squarely before the country as a whole the great importance to all classes, particularly to labor, of a movement having for its purpose the stabilization of industry."

Machinery Markets and News of the Works

DEMAND CONTINUES FAIR

Slight Recessions from March Volume in Some Quarters

Inquiries Are Still Numerous, However, and Outlook at Least for Remainder of This Month Is Good

UNFILLED orders of machine tool builders are in large volume, and the rate at which business is being received this month indicates that many of the machine tool plants will be working at present capacity until well toward the end of the first half of the year. While in certain sections of the country and in certain lines of tools there have been slight recessions in buying activity this month compared with March, the average seems to be holding up well.

The automotive industry is believed to have done the major part of its spring buying and no further activity of note in that field is expected before fall. Railroad buying is disappointingly small, and the principal signs of encouragement are renewed inquiries from the New York Central, which has bought very little this year, and the prospect that the Santa Fe will close next week on a list of considerable size.

In the East, inquiries have been more numerous and

sales have been holding fairly close to the April level. The General Electric Co. has issued inquiries for 25 or 30 tools, and requests for prices on single machines come from all sections of the industrial field. New York sales offices are figuring on about 8 or 10 tools wanted by Dwight P. Robinson & Co. for export.

Tractor plants in the Middle West are among those whose machine tool needs figure prominently in the Chicago market. Fresh inquiry has grown in that territory, and while sales for the first half of April fell below those of the last half of March, the outlook is sufficiently promising to cause expectations of a larger volume during the remainder of the month.

The Cleveland and Cincinnati districts are experiencing a slight recession in buying, partly because of the fact that the automotive industry has satisfied its needs for the present. The Kelsey Wheel Co., Detroit, has bought a number of tools, including drilling machines and lathes. A Cleveland turret lathe manufacturer has sold seven machines for export.

The National Machine Tool Builders' Association reports that March business was better for its members than that of January. The March figures show an upward trend for the industry for the sixth consecutive month. That month's sales were again higher than in any month since May, 1920, and were at about the level reached in the summer of 1919.

New York

New York, April 17.

CONSIDERABLE inquiry for machine tools has come out in the past week, including 25 or 30 tools wanted by the General Electric Co. and a number for the New York Central Railroad. Scattered inquiry for single machines also is fairly large. Sales for the first half of April have run a little behind the same number of days in March, but the interest of buyers is still so keen that sellers entertain hope that the month will close with a total volume equal to that of last month. Dwight P. Robinson & Co., New York, are inquiring for eight or ten tools for export.

Among purchases by railroads in past week were the following: Boston & Maine, Nos. 10 and 20 Stanley drills; Chicago, Rock Island & Pacific, 36-in. Aurora drill; New York Central Railroad, two Ransom grinders and 24-in. Aurora drill. Cornell University has purchased a No. 111 Ransom drill.

Included in purchases by industrial users of tools was a list of second-hand machines by a Pittsburgh steel company. This list consisted of a 21-in. x 22-ft. LeBlond lathe, 30-in. x 45-ft. Pond lathe, 6-ft. Ridgeway radial drill, 24-in. Safety Emery Wheel Co. grinder, and 4 5/8-in. Bement horizontal boring mill. A company in Pennsylvania has purchased an extra heavy-duty, end-driven axle lathe; a Chicago manufacturer, 1500-lb. single frame Niles steam hammer; an Indiana company, 14-in. Pratt & Whitney vertical surface grinder; a Chicago manufacturer, duplex hand centering machine; a foundry in Chicago, rebuilt 6 x 14-in. Pratt & Whitney thread milling machine; a Chicago forging maker, two No. 3 Pratt & Whitney die sinkers; a Baden company, 13 x 30-in. Pratt & Whitney lathe; a Cincinnati machine tool builder, 13 x 30-in. and 16 x 60-in. Pratt & Whitney lathes; an Eastern electric manufacturer, 12-in. vertical shaper; a Bridgeport, Conn., company two No. 11 multiple

spindle drills; a Philadelphia electric company, 13 x 36-in. lathe; a New York company, 20-in. Niles-Acme shaper for shipment to Louisville, Ky.; a Pittsburgh company, Williams 2-in. single-spindle bolt machine for installation in West Virginia.

Newburgh Public Service Corporation, Newburgh, N. Y., is said to be planning to rebuild motor bus service, repair and garage building, destroyed by fire March 31, with loss in excess of \$125,000.

W. C. Winters, 2772 Fulton Street, Brook'yn, architect, has plans for a one-story automobile service, repair and garage building, 50 x 300 ft., at Flushing, L. I., to cost about \$100,000 with equipment.

Board of Education, Glen Cove, L. I., plans installation of manual training equipment in new high school to cost close to \$1,000,000. William J. Beardsley, 49 Market Street, Poughkeepsie, N. Y., is architect.

R. H. Macy & Co., Broadway and Thirty-fourth Street, New York, has plans for a two-story automobile service, repair and garage building for company trucks and cars, to cost more than \$110,000 with equipment. R. D. Kohn, 56 West Forty-fifth Street, is architect.

New Jersey Zinc Co., 160 Front Street, New York, has work under way on an addition to its plant at Aquashicola, near Palmerton, Pa., for metal slab production, to cost more than \$100,000 with equipment.

American Gas & Electric Co., 30 Church Street, New York, is arranging an appropriation of about \$46,000,000 for expansion and betterments in light and power utilities in different parts of the country. Approximately \$17,000,000 will be used for completion of addition to steam-operated generating plant at Philo, Ohio, operated by Ohio Power Co., Canton, Ohio, an affiliated organization; a fund of \$12,000,000 will be used for new steam-electric generating plant near Pennsville, N. J., for Atlantic City Electric Co., Atlantic City, N. J., another subsidiary, and for service at Wilmington, Del. About \$7,000,000 will be expended for steel tower and other transmission lines, including 132,000-volt line from Philo to Fostoria, Ohio; and \$4,000,000 will be employed

for new power substations and distributing facilities in different localities.

Hinsdale Iron Works, Inc., 1058-64 Rockaway Avenue, Brooklyn, has taken out a permit for a one-story addition, 60 x 100 ft., to cost close to \$20,000 with equipment. C. A. Levitt, 2995 Bedford Avenue, is architect.

United Electric Light & Power Co., 130 East Fifteenth Street, New York, has completed plans for two one-story equipment storage and distributing buildings, 35 x 136 ft., with repair facilities, to cost about \$55,000. Thomas E. Murray, Inc., 55 Duane Street, is engineer.

Board of Education, Great Neck, L. I., plans installation of manual training equipment in new junior and senior high school to cost \$750,000, for which bids have been asked on general contract. Guilbert & Betelle, Chamber of Commerce Building, Newark, N. J., are architects.

Beam-O-Lite Sign Co., New York, has leased space in building at 135-9 West Twenty-sixth Street for manufacture of display signs. Initial production will be given over largely to assembling.

General Electric Supply Corporation, 190 Sixth Avenue, New York, a subsidiary of General Electric Co., Schenectady, has leased seven-story building at 585-91 Abingdon Square, totaling 125,000 sq. ft. floor space, for new equipment storage and distributing plant. Present works will be removed to new location.

Ovens, power equipment, conveying and other machinery will be installed in two-story plant to be erected by Cox Baking Co., Van Wyck Avenue, Jamaica, L. I., 50 x 300 ft., to cost about \$100,000. C. B. Comstock, 110 West Fortieth Street, New York, is architect and engineer.

Calumet & Arizona Mining Co., New Cornelia Copper Co., and Phelps Dodge Corporation, 99 John Street, New York, have completed agreement to acquire an interest in Nichols Copper Co., Laurel Hill, L. I., and will use electrolytic refining plant of that company for a large portion of combined output from mines. Nichols company, in association with other interests noted, plans construction of new copper refinery in Texas, or other southwestern locality, to cost close to \$3,500,000 with machinery. Site is being selected.

John Nordmeyer, 260-2 Tenth Avenue, Paterson, N. J., has plans for a one-story machine shop to cost about \$18,000 with equipment.

Roeckle Pan Machine Corporation, 161 Ogden Street, Newark, manufacturer of machinery, plans new one-story plant, 125 x 125 ft., at Newton Falls, Ohio, and will remove present plant to new location. Temporary quarters will be occupied at Newton Falls pending completion of new plant.

Forstner Chain Corporation, 646 Nye Avenue, Irvington, N. J., manufacturer of watch chains, metal novelties, etc., has awarded general contract to W. J. MacEvoy Construction Co., 85 Academy Street, Newark, for a three-story addition, 60 x 120 ft., to cost about \$75,000 with equipment. Edward C. Eppie, 9 Clinton Street, Newark, is architect.

Queens Borough Gas & Electric Co., Rockaway district, Queens Borough, New York, has arranged for bond issue of \$4,000,000, a portion of proceeds to be used for extensions and improvements, including transmission line and power station construction.

Doehler Die Casting Co., Brooklyn, has removed its executive offices to 386 Fourth Avenue, New York.

Radworth Mfg. Corporation, 302 Park Avenue, Brooklyn, has been formed to make bell ringing transformers, conduit fittings and porcelain bushings. Company has its own shop and machinery and equipment have been purchased.

Doerfler-Hofstetter Mfg. Co., Inc., manufacturer of dies and tools, has started operations in its plant at 24 Scott Street, Newark.

St. Louis

St. Louis, April 16.

REVISED plans are being drawn by Imperial Casket Co., 1415 St. Louis Avenue, Kansas City, Mo., for a two-story plant to cost \$45,000 with equipment. W. J. Koch, Mutual Building, is architect.

Chevrolet Motor Co., Flint, Mich., has acquired about 30 acres at Kansas City, Mo., and is reported planning a new assembling plant to cost more than \$350,000 with equipment.

Usona Mfg. Co., 3510 Chouteau Avenue, St. Louis, manufacturer of architectural and ornamental iron products, has awarded general contract to Gillespie & Daly, International Life Building, for a one-story addition, 75 x 80 ft., to cost approximately \$24,000 with equipment.

Atlas Tool & Mfg. Co., 5707 Manchester Avenue, St. Louis, is said to be planning a one-story addition, to cost close to \$40,000 with equipment.

Arkansas Portland Cement Co., affiliated with Oklahoma Portland Cement Co., Ada, Okla., is arranging for early

erection of new mill near Shaal, Ark., to cost in excess of \$1,000,000 with machinery.

Associated Motor Terminals Co., St. Louis, is contemplating erection of a six-story service, repair and garage building, 88 x 130 ft., to cost close to \$300,000 with equipment.

Colonial Steel Co., 928 Main Street, St. Louis, has awarded general contract to W. C. Harting Construction Co., International Life Building, for a one-story storage and distributing plant, 50 x 85 ft., to cost about \$28,000 with equipment.

Benson Motor Co., Community Building, North Kansas City, Mo., has work under way on a one-story and basement service and repair building, to cost close to \$50,000 with equipment. John C. Lawrence, Commercial Building, is architect.

U. & I. Boiler & Machine Works, Inc., Tonkawa, Okla., recently organized by G. W. Larabee, Tonkawa, and associates, plans early operation of a local plant, including boiler and tank shop. J. W. Duncan, Tonkawa, is also interested in company.

Cities Service Co., Wichita, Kan., has authorized immediate construction of pipe line from Wichita to Kansas City, Mo., for natural gas service, about 130 miles, to cost in excess of \$400,000. Headquarters are at 60 Wall Street, New York.

W. H. Owen Motor Co., 1619 Tower Grove Avenue, St. Louis, is completing plans for a one-story service, repair and garage building, 85 x 200 ft., to cost about \$70,000 with equipment. Nolte & Nauman, Fullerton Building, are architects.

Ford Motor Co., Detroit, is planning a two-story factory branch and distributing plant, 100 x 140 ft., at Apache, Okla., to cost about \$120,000 with equipment.

City Council, Perryville, Mo., plans installation of centrifugal pumping machinery, 75,000-gal. elevated steel tank and auxiliary equipment, in connection with municipal waterworks. A bond issue of \$125,000 is being arranged. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Oklahoma Gas & Electric Co., Oklahoma City, Okla., has work under way on addition to steam-operated power plant at Harrah, Okla., to increase capacity by 30,000 kw.

New England

Boston, April 16.

THE machine tool market continues dull. The largest order closed the past week was for a 250-lb. pneumatic hammer to a Utica, N. Y., shop, and another hammer of the same type to an Indiana firm. Dealers continue to receive inquiries, mostly for single machines and small ones, but orders are slow in being placed. Where expensive tools have been under negotiation prospects for buying are apparently as far away as they were one or more months ago. There is still need for new metal working equipment throughout New England, but replacement programs are not being actively put forth. In contrast with dealers, the majority of New England machine tool makers are fairly busy with orders received from other sections of the country.

Small tools are still selling slowly, users ordering only in small lots.

B. L. and F. S. Ashmun, Bridgeport, Conn., have acquired Armstrong Mfg. Co., that city, manufacturer of chucks and dies.

Carl J. Malmfeldt, 15 Lewis Street, Hartford, Conn., architect, will close bids next week on a two-story and basement trade school for that city, 76 x 256 ft., with two wings, 41 x 51 ft.

W. N. Craw Novelty Co., Norwalk, Conn., toys and novelties, has reincorporated with a capital stock of \$250,000, and will add equipment for manufacture of new products.

Keeler & Lang, Inc., recently organized, manufacturer of paints, varnishes and oils, has purchased Matthews & Willard plant, Scovill Mfg. Co., Waterbury, Conn., and will install motors, paint mixing, grinding, conveying and other equipment.

Bassick Co., Newark, N. J., a subsidiary of Stewart-Warner Co., Chicago, has purchased plant of Columbia Phonograph Co., Bridgeport, Conn., and will consolidate manufacture of automobile accessories at latter plant.

City Council, Springfield, Mass., has authorized an appropriation of \$234,000 for new pumping plant for sewage system, and will soon call for bids for equipment. City engineer is in charge.

The Crane Market

INQUIRY for locomotive cranes continues good, but the overhead crane field is rather inactive. The Amtorg Trading Corporation is reported to have closed on both its lists of cranes for Russia. Still pending is the list of cranes and steam shovels inquired for by Dwight P. Robinson & Co., New York, for use in Argentina and the five 10-ton locomotive cranes for the Boston & Maine Railroad. New inquiry for overhead cranes is light, but there is a substantial volume of old inquiry still in the market. Electric hoists and chain blocks are in good demand and some sizable sales both in the domestic and export markets are reported. The Lehigh Coal & Navigation Co., Philadelphia, is reported about to close on a 10-ton, 20-ft. span, single I-beam, hand power crane.

Among recent purchases are:

Amtorg Trading Corporation, 165 Broadway, New York, six 15-ton, kerosene-driven crawl-tread locomotive cranes for Russia from two American makers; nine 50-ton standard

locomotive cranes for Russia from Industrial Brownhoist Corporation.

Standard Traprock Corporation, 26 Cortlandt Street, New York, 40-ton, 4-motor floor controlled overhead crane from unnamed builder.

Boston & Maine Railroad, 5-ton, overhead traveling crane from unnamed builder.

Silverstone & Ervin, Bridgeport, Conn., 5-ton, 9-ft. 6-in. span, 2-motor overhead crane for city of Bridgeport from Box Crane & Hoist Corporation.

Pittsburgh Plate Glass Co., for Ford City, Pa., works, four 20-ton cranes from Cleveland Crane & Engineering Co., and two 5-ton cranes from Alliance Machine Co.

Spang, Chalfant & Co., Inc., for Economy, Pa., works, bloom charger from Alliance Machine Co.

Chicago, Burlington & Quincy, Chicago, 3-motor, 5-ton, 54-ft. span gantry crane from Whiting Corporation.

National Packaging Machinery Co., 172 Green Street, Jamaica Plain, Boston, has purchased three-story and basement mill at Newton, Mass., with tract of six acres. Purchasing company will remodel and remove to new location.

Townsend Motor Car Co., Derby Street, Salem, Mass., has awarded general contract to Pitman & Brown, 11 Washington Street, for one-story addition to service and repair department, 70 x 200 ft., to cost close to \$75,000 with equipment.

R. Hight Rines, Portland, Me., has awarded contract to Morton C. Tuttle Co., Boston, for a two-story garage, 90 x 150 ft., to cost \$90,000. Webster & Libby, Portland, Me., are architects.

Whiting Body Works, Westboro, Mass., has leased a portion of factory on Milk Street for manufacture and repair of automobile bodies.

United States Gypsum Co., 300 West Adams Street, Chicago, has plans under way for initial units of plant at Charlestown, Boston, for manufacture of building blocks and other cast gypsum products. Entire project is reported to cost in excess of \$1,000,000 with equipment.

Blackstone Valley Gas & Electric Co., Pawtucket, R. I., is completing plans for a four-story and basement addition, 20 x 152 ft., to its No. 1 steam-operated electric generating plant, to cost about \$125,000.

New England Telephone & Telegraph Co., 50 Oliver Street, Boston, has leased a building at Somerville, Mass., for service and repair shop, with garage facilities, for company automobiles and trucks.

New England Public Service Co., 131 State Street, Boston, operating Tilton Electric Light & Power Co., Middlebury Electric Co., Windsor Electric Light Co., and other light and power utilities, has arranged for a preferred stock issue of \$4,387,500, a portion of proceeds to be used for expansion and improvements.

General Electric Welding Co., 206 Hunts Avenue, Pawtucket, R. I., has been organized to engage in electric welding, particularly for automotive manufacturers and large machine and railroad shops. Building and equipment have been purchased, but company is in market for steel tank plates and structural shapes.

Cleveland

CLEVELAND, April 16.

MACHINE-TOOL dealers and manufacturers are doing a fair volume of business in single machines and some report a gain over March. The inquiry situation is spotty, new inquiries having increased with some and fallen off with others. The Kelsey Wheel Co., Detroit, is buying some equipment, including several drilling machines and lathes. Not much business is coming from Michigan automobile manufacturers. Tire manufacturers in Akron who recently have been buying a moderate amount of new machine tool equipment now seem well supplied and the market is dull in that city. Foreign business shows more life. A Cleveland turret lathe manufacturer booked export orders for seven machines the past week.

Bids have been asked on general contract by Acme Auto Radiator Co., 7707 Carnegie Avenue, Cleveland, for a one-story addition, 40 x 175 ft., to cost about \$60,000 with equipment. T. C. Cerny, 4025 East Fifty-second Street, is architect.

Department of Public Service, City Hall, Cleveland, has plans for a one-story pumping plant and filtration works in Nottingham district, for municipal water system, to cost in excess of \$300,000 with equipment. A. L. Quayle, City Hall, is city engineer.

Willys-Overland Co., Toledo, Ohio, has acquired a tract of 20 acres in Laguna-Maywood industrial district, Los Angeles, as site for a new automobile assembling plant. Initial units are reported to cost close to \$1,000,000 and are scheduled to be ready for service in August.

Standard Electric Stove Co., 1720 North Twelfth Street, Toledo, is considering a new plant unit to cost upward of \$100,000 with equipment.

Industrial Rayon Co., Ninety-eighth Street and Walford Avenue, Cleveland, plans construction of a steam power plant and machine shop at new mill at Covington, Va. Entire project is reported to cost more than \$2,000,000.

Ironton Mfg. Co., Ironton, Ohio, manufacturer of metal roofing, siding, etc., has acquired property near Front and Mulberry Streets, and is said to be planning an addition.

American Steel Abrasives Co., Gallon, Ohio, maker of steel shot and eversharp steel grit, is erecting a two-story addition, 40 x 80 ft., which will nearly double its capacity.

Gulf States

BIRMINGHAM, April 16.

PLANs have been filed by Alamo Iron Works, Corpus Christi, Tex., for a one-story addition, 20 x 150 ft., to cost about \$23,000.

Atchison, Topeka & Santa Fe Railway Co., Galveston, Tex., has plans for a one-story power house at its shops at Cleburne, Tex., to cost more than \$80,000 with equipment. Frank Merritt is chief engineer.

Texas Airplane Corporation, R. F. D. No. 1, San Antonio. C. W. Payne, secretary, is planning erection of one-story works, 22 x 100 ft., for assembling and repair of aircraft.

Houston Gas Securities Co., Houston, Tex., operating Houston Gas & Fuel Co., and Houston Gulf Gas Co., has acquired Southern Gas Co., operating natural gas properties in vicinity of Laredo, Tex., and will consolidate with system. New owner is considering extensions and improvements, including pipe line construction.

Clarence W. King, Giddens-Lane Building, Shreveport, La., architect, will soon begin work on new automobile service, repair and garage building, to cost about \$85,000 with equipment.

Texas Gulf Power Co., Fort Worth, Tex., has acquired light and power plant, and waterworks at Strawn, Tex. Plans are under way for expansion in power station and installation of additional machinery. Extensions will be made in transmission lines.

Town Council, Rolling Fork, Miss., is asking bids until May 1 for equipment for municipal power plant, including one Diesel oil engine, 120 to 180 hp., direct-connected to generating unit, with capacity of 90 to 140 kva., with exciter, switchboard, instruments and auxiliary equipment.

Humble Oil & Refining Co., Houston, Tex., is reported planning an addition to its refinery at Ingleside, Tex., for sulphuric acid recovery. Humble Pipe Line Co., affiliated organization, has acquired right-of-way from Aransas Pass to Harbor Island, vicinity Fort Aransas, Tex., and will construct new pipe line.

Crystal Ice & Fuel Co., Clarksdale, Miss., is planning construction of one-story ice-manufacturing plant at Yazoo City, Miss., to cost about \$50,000 with equipment.

McGough Motor Co., 206 Dexter Avenue, Montgomery, Ala., is completing plans for a two-story service, repair and garage building, 104 x 200 ft., to cost close to \$85,000 with equipment. Okel & Cooper, Bell Building, are architects.

Ouachita Natural Gas Co., Shreveport, Tex., B. D. Hunter, president, has authorized construction of pipe line from Alto, Richland Parish, to Sterlington and Sarepta, Webster Parish, to cost more than \$3,000,000 with booster stations, etc. At last noted place, connection will be made with natural gas system of Magnolia Gas Co.

Federal Electric Co., 8700 South State Street, Chicago, manufacturer of electric signs, etc., is reported considering establishment of new factory branch at Dallas, Tex., for manufacture of Neon illuminated displays, to cost more than \$30,000 with equipment.

Water Works Commission, Phenix City, Ala., is asking bids until April 26 for pumping station, water purification plant and auxiliary equipment for a municipal waterworks. Warren E. Darrow, Columbus, Ga., is engineer.

Joseph Finger, Keystone Building, Houston, Tex., architect, has asked bids on general contract for a two-story automobile service, repair and garage building, 125 x 125 ft., to cost close to \$200,000 with equipment.

American Service Co., Houston, Tex., operating ice-manufacturing and cold storage plants, is disposing of a note issue of \$3,150,000; a portion of fund to be used for expansion and improvements.

Spears & Co., El Paso, Tex., are considering rebuilding portion of cottonseed oil mill recently destroyed by fire, with loss more than \$35,000 including equipment.

West Texas Utilities Co., Quanah, Tex., has begun work on first unit of new steam-operated electric power plant at Lake Pauline, near Quanah, and will soon proceed with other units with capacity of 60,000 hp. Four new transmission lines will be built. Entire project will cost in excess of \$500,000 with equipment.

Philadelphia

PHILADELPHIA, April 16.

BIDS have been asked by Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, on general contract for a one-story motor bus repair shop, 282 x 406 ft., comprising machine shop, overhauling and reconditioning department, parts division and other mechanical departments, to cost in excess of \$250,000 with equipment.

Pyramid Motor Freight Corporation, Hancock and Columbia Streets, Philadelphia, has awarded general contract to John I. Dillon, 1804 North Front Street, for a one-story machine shop for motor truck repairs and reconditioning, to cost about \$17,000 with equipment.

Domenick Leberl & Son, 1137 South Broad Street, Philadelphia, operating a general iron works, have filed plans for a new one and two-story works, 60 x 112 ft., and 20 x 60 ft., to cost close to \$24,000 with equipment.

Department of Public Works, Bureau of Water, City Hall, Philadelphia, is asking bids until April 26 for motor-driven pumping equipment and auxiliaries for Belmont pumping plant, contract No. 916; and for electrical equipment, switchboards, etc., for same station, contract No. 917.

Roller Bearing Co. of America, Inc., 141 Frelinghuysen Avenue, Newark, N. J., has arranged for purchase of former plant of Mercer Motor Car Co., Whitehead Road, Trenton, N. J., comprising 11 acres and factory buildings totaling 175,000 sq. ft. floor space, for production of roller bearings for automobiles and industrial equipment. Present works will be removed to new location. David H. Litter and Alan Jones head purchasing company.

Eastern Shore Public Utilities Corporation, Salisbury, Md., is negotiating for purchase of municipal electric light and power plant at Dover, Del., and plans expansion in that district, including transmission line construction.

Board of Education, Royersford, Pa., is considering installation of manual training equipment in two-story high school to cost \$135,000, for which plans are being drawn by Hasness & Albright, 213 Walnut Street, Harrisburg, Pa., architects.

A State charter has been secured by Reading Airplane Co., Reading, Pa., with capital stock of \$20,000, and work will soon begin on plant for production of aircraft and parts, with repair division. Company was formed recently by Allen K. Owen, 21 South Eleventh Street, who will be treasurer of organization; and Lloyd A. Gass, 115 Jefferson Street, Hyde Park, Pa.

Leon H. Brendlinger, 1130 Windsor Street, Reading, Pa., formerly connected with William Remppis Co., Reading, manufacturer of ornamental iron and steel products, is organizing a company to construct and operate a plant at Mount Carmel, Pa., for similar line of production, including iron fencing, fire escapes, etc. Property has been secured

and work on initial unit will soon begin. R. J. Best and H. C. Ebinger, Reading, are also interested in new company.

Harrisburg Airport Corporation, Harrisburg, Pa., care of F. Brewster Wickersham, Harrisburg, attorney, now being formed by local interests with capital stock of \$25,000, plans early establishment of airport on property now being acquired, to include hangars, repair shops for planes and motors, oil storage and distributing works, etc. Frank A. Robbins, Jr., Chamber of Commerce, is interested in project.

Philadelphia Suburban Counties Gas & Electric Co., Philadelphia, will make extensions in transmission lines for connection of plant on Barbados Island, Norristown, Pa., with Conowingo hydroelectric power project of Philadelphia Electric Co. A power substation and switching station will be installed at Bridgeport, Pa. Day & Zimmermann, Inc., Sixteenth and Walnut Streets, Philadelphia, is engineer.

Pittsburgh

PITTSBURGH, April 16.

ONE machine tool dealer has booked three vertical shapers, but in general orders have been for single tools which, so far this month, have not been as numerous as during the first eight or ten weeks of the year.

Plans have been approved by Baltimore & Ohio Railroad Co., Baltimore, for extensions and improvements in engine house and locomotive repair shops at New Castle, Pa., to cost about \$150,000 including equipment.

Shenango Motor Co., Washington Street, New Castle, Pa., has awarded general contract to Paul Esposito, 782 Franklin Street, Woodlawn, Pa., for a two-story service, repair and garage building, to cost \$130,000 with equipment. F. H. Foulk, Fairmount Cedar Building, Cleveland Heights, Ohio, is architect.

Gauley Power Co., Charleston, W. Va., has applied for permission to construct and operate a hydroelectric generating plant on Gauley River, Fayette County, with initial capacity of 60,000 hp. A transmission line will be built. Entire project is reported to cost more than \$600,000.

Board of Education, Woodlawn, Pa., contemplates installation of manual training equipment in an addition to high school to cost about \$125,000. Carlisle & Sharrer, Martin Building, Pittsburgh, are architects.

Penn-Ohio Edison Co., Sharon, Pa., is completing arrangements for a merger with Northern Ohio Power Co., and plans expansion and improvements, including transmission line construction.

American Metal Co., Ltd., American Zinc & Chemical Co., Langeloth Coal Co., and Clymac Molybdenum Co., all of Pittsburgh, have removed their offices to 2010 Clark Building.

Address of Lewis Foundry & Machine Co., formerly at 1514 Farmers Bank Building, Pittsburgh, is now P. O. Box 1591, Pittsburgh.

Trico Fuse Mfg. Co., Milwaukee, has removed its Pittsburgh office to larger quarters at 405 Penn Avenue. William A. Bittner is in charge.

Detroit

DETROIT, April 16.

PLANS are being prepared by Board of Trustees, Michigan School for the Blind, Lansing, for one-story power house, to cost about \$100,000 with equipment. Installation will include two 175-hp. boilers, automatic stokers, coal and ash-handling equipment, etc.

Bohn Aluminum & Brass Corporation, 2512 East Grand Boulevard, Detroit, has awarded general contract without competition to Kriehoff Co., French Road, for one-story addition to foundry, to cost about \$60,000 with equipment. Christian W. Brandt, Francis Palms Building, is architect.

Hupp Motor Car Corporation, 3641 East Milwaukee Street, Detroit, has purchased for expansion plant of Huebner Lumber & Mfg. Co., consisting of close to four acres and factory buildings.

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, has awarded general contract to W. J. Kauffman, 10610 Shoemaker Avenue, for a three-story addition, 30 x 130 ft., to cost upward of \$60,000 with equipment.

Monroe Auto Equipment Co., Monroe, Mich., is completing plans for a one-story addition, to cost more than \$150,000 with equipment.

Sears, Roebuck & Co., Arthington and Homan Avenues, Chicago, will proceed with a new multi-story storage and distributing plant at Detroit, to cost close to \$500,000 with equipment. Company will also build similar unit in western part of city, to cost approximately \$550,000 with equipment.

Graham-Paige Motor Corporation, West Warren Street, Detroit, has plans for a one-story service, repair and garage building at Sault Ste. Marie, Mich., to be occupied under lease by Wynn Auto Sales Co., Sault Ste. Marie, local representatives, to cost close to \$45,000.

Grand Rapids Gas Light Co., Grand Rapids, Mich., plans rebuilding booster pumping station destroyed by fire April 7, with loss in excess of \$100,000 including equipment.

Commonwealth Brass Co., 6781 Commonwealth Avenue, Detroit, has awarded general contract to Grant Powers, 4847 Whitfield Avenue, for a two-story addition, to cost close to \$35,000 including equipment. Burrowes & Eurich, 415 Brainard Street, are architects.

Board of Education, Ecorse, Mich., is said to be planning installation of manual training equipment in new two-story high school to cost upward of \$175,000, for which superstructure will soon begin. Joseph G. Kastler, Detroit Savings Bank Building, Detroit, is architect.

Electric Sprayit Co., Inc., formerly at Detroit, is now located at 320 East Colfax Street, South Bend, Ind.

South Atlantic States

BALTIMORE, April 16.

BIDS are being asked by C. Hoffberger & Co., 530-48 East Monument Street, Baltimore, operating ice and cold storage plants, for a new eleven-story cold storage and refrigerating plant, to cost \$900,000 with machinery. J. H. Wickersham, Appel Building, Lancaster, Pa., is engineer. J. H. Hoffberger is president.

Disappearing Screen Co., Inc., Berkeley, Cal., has leased building at 264 Colvin Street, Baltimore, for an Eastern works for manufacture of patented screens and kindred products.

Board of District Commissioners, District Building, Washington, is asking bids until April 25 for three vertical type, motor-driven pumping units for sewage system, including shafting, couplings, bearings, automatic controls and starting equipment; until April 21, for 1000 water meters.

G. N. Ray, 1219 Connecticut Avenue, N. W., Washington, architect, will soon take bids for a four-story automobile service, repair and garage building, to cost about \$250,000 with equipment.

Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has authorized increase in capital stock from 1,450,000 to 1,500,000 shares, no par value, a portion of proceeds to be used for expansion, including acquisition of Mount Washington Electric Light & Power Co., Patapsco Electric & Mfg. Co., and other light and power utilities, with extensions in transmission lines and power facilities.

Roanoke River Power Co., Richmond, Va., is arranging for early construction of hydroelectric power plant on Roanoke River, taking lands in Mecklenburg County, Va., and Warren, Vance and Granville Counties, N. C. Station will have initial capacity of 70,000 hp.; a 60-mile transmission line will be built to Danville, Va., for connection with system of Appalachian Power Co., which is interested in project. It will cost in excess of \$1,000,000.

Burge & Stevens, Marietta Building, Atlanta, Ga., architects, will soon take bids on general contract for a five-story automobile service, repair and garage building, 88 x 135 ft., to cost close to \$300,000 with equipment.

Water and Light Department, Thomasville, Ga., D. R. Pringle, superintendent, is asking bids until May 7 for one 2000-kw. steam turbine, with generator and accessories; and for one 4500 sq. ft. condenser, with auxiliaries, for municipal light plant.

Fogle Furniture Co., Winston-Salem, N. C., has plans for a new three-story factory, 64 x 145 ft., to cost more than \$40,000 with equipment. F. A. Fogle is president.

General purchasing officer, Panama Canal, Washington, is asking bids until May 2 for 22,000 ft. wire rope; 10,000 ft. plow steel wire rope; 5000 ft. cast steel wire rope; 70,000 lb. wire nails; drills, stocks and dies, reamers, vises, wrenches, tinners' snips, and other tools and equipment, Panama schedule 1872; until April 27 for trench pumps, chain blocks, pipe pushing jack, etc., Panama schedule 1870.

Lindsay-McMillan Co., 93 South Water Street, Milwaukee, manufacturer of refined oils, etc., has purchased five acres at Savannah, Ga., as site for new plant for production of heavy core oils. Initial units will be one-story and will cost upward of \$60,000 with equipment.

Clinchfield Sand & Feldspar Corporation, Hearst Tower Building, Baltimore, is arranging for early construction of feldspar crushing, grinding and pulverizing mill in vicinity of Brookneal, Va. A portion of equipment will be secured from a plant at Charlotte, N. C., and additional machinery acquired. Company will operate feldspar quarries at Moneta, Va., for raw material supply.

East Coast Utilities Co., Richmond, Va., operating North-

west Carolina Utilities, Inc., Hermitage Ice & Storage, Inc., Virginia East Coast Utilities, Inc., and other power and light utilities, ice plants and water systems, is arranging an expansion and improvement program to cost about \$1,000,000.

Buffalo

BUFFALO, April 16.

CONTRACT has been let by Trico Products Co., 624 Elliott Street, Buffalo, manufacturer of automobile accessories, to J. W. Cowper Co., Fidelity Building, for a new plant unit to cost \$200,000 with equipment.

New York Air Brake Co., Watertown, N. Y., has arranged for increase in capital from 300,000 to 500,000 shares of stock, no par value, a considerable portion of proceeds to be used for development of new products.

King Mfg. Co., 254 Rano Street, Buffalo, manufacturer of radio equipment, is planning for expansion in output; manufacture of cabinet sets will be decreased and output concentrated on metal-encased sets.

Rochester Auto Inn, Inc., care of Steele & Stone Co., National Bank of Rochester, Rochester, N. Y., has awarded general contract to Turner Construction Co., Buffalo for a six-story service, repair and garage building, to cost about \$225,000 with equipment. Gordon & Kaelber, Sibley Block, are associate architects.

Stockholders of Savage Arms Corporation, Utica, N. Y., have authorized formation of a subsidiary to take over and expand electrical household equipment division for increase in manufacture of electric washing machines, etc. J. Stevens Arms Co., Chicopee Falls, Mass., a subsidiary, will be continued as heretofore, and production of firearms and sporting weapons will be concentrated at that plant.

Continental Can Co., Syracuse, N. Y., is said to be planning early call for bids on general contract for new multi-story plant at Chicago, to cost in excess of \$500,000 with equipment. Francisco & Jacobus, 360 North Michigan Avenue, Chicago, are architects and engineers.

Taylor Brothers Aircraft Co., 42 Allen Street, Rochester, N. Y., has been organized to make airplanes and airplane equipment, particularly two and four-place monoplanes. Equipment and materials have been purchased.

Chicago

CHICAGO, April 16.

FROM the standpoint of actual orders, the week just closed has not been satisfactory to machine tool dealers. Volume of sales has fallen for the first two weeks in April below that of the last 14 days in March. However, new inquiry has grown and propositions on which quotations have been made are numerous, so there is some promise that order books will be swelled during the remainder of the month. Many of the new requests for prices come from tractor plants at Chicago and Peoria, Ill., and Waterloo, Iowa.

The railroad field is none too promising. The Santa Fe, which is asking for revised figures on a number of items, has not started to buy against its list. The Burlington is taking prices on a 6-ft. radial and a 20-in. drill. A forging plant has purchased a 32-in. shaper. The general contract for the Austin High School, Chicago, has been signed and this project will now go ahead.

Bliss & Laughlin, Inc., Harvey, Ill., manufacturer of turned shaftings and cold drawn and cold rolled steel has purchased for expansion plant and property of Hotchkiss, Blue & Co., adjoining. Property consists of five acres, two of which are improved with buildings.

Bids will soon be asked by Chicago Pump Co., 2336 Wolfram Street, Chicago, for a one-story addition to cost about \$35,000 with equipment. Alfred S. Alschuler, 20 West Jackson Boulevard, is architect.

Rapid Roller Co., 812 West Austin Avenue, Chicago, manufacturer of printing rollers, etc., has awarded general contract to G. L. Arquette, 180 North Michigan Avenue, for a three-story plant unit, 100 x 125 ft., to cost in excess of \$200,000 with equipment.

John Deere Co., Moline, Ill., manufacturer of agricultural equipment, will soon begin work on one-story foundry, to cost more than \$35,000 with equipment.

Iowa Public Service Co., Waterloo, Iowa, is disposing of a preferred stock issue of \$500,000, a portion of proceeds to be used for extensions and improvements, including transmission line construction.

City Council, Aitkin, Minn., is planning extensions and

improvements in municipal electric light and power plant, including installation of additional equipment. Extensions will be made in transmission lines.

Kremer Motor Co., 1518 Hennepin Avenue, Minneapolis, Minn., will soon take bids on general contract for a one-story service, repair and garage building, 150 x 155 ft., to cost about \$110,000 with equipment. P. E. Crosier, New York Life Building, is architect.

Super-Power Co. of Illinois, 72 West Adams Street, Chicago, affiliated with Commonwealth Edison Co., Illinois Power & Light Corporation and other utilities, is disposing of a bond issue of \$10,000,000, a portion of proceeds to be used for power plant construction and transmission lines. Work is now under way on new generating plant at Powerton, Ill.

Wyoming-Mystic Iceless Refrigerator Co., Cheyenne, Wyo., is planning erection of new plant, reported to cost in excess of \$35,000 with equipment.

Lyons Metal Products, Inc., Aurora, Ill., has been organized as step in probable consolidation of Lyons Metallic Mfg. Co., Aurora; Durant Co., Chicago, and Fred Medart Mfg. Co., St. Louis. New company will manufacture steel lockers, office furniture and store fixtures. General offices will probably be maintained at Aurora.

Gunit Corporation, Rockford, Ill., has been organized to manufacture gunite and other alloys and metals. Company at present occupies part of plant of Rockford Malleable Iron Works where manufacture has been started.

Harrington-Seaberg Co., Moline, Ill., manufacturer of police, fire alarm and traffic signal equipment and electric flashers, has let contract to Axel Carlson Construction Co., local, for four-story factory, 62 x 135 ft., to cost \$75,000. Another unit, 94 x 135 ft., will be erected later.

Joseph L. Lieberman Iron Co., Chicago, has removed its offices to 404 Lake Michigan Building, 180 North Michigan Avenue.

Cincinnati

CINCINNATI, April 16.

VOLUME of machine tool sales the first half of April was only slightly less than that in the last two weeks of March, so that bookings this month are expected to be well maintained even though the total business probably will show a mild recession from the high level of the previous 60 days. Purchases by automobile companies are sporadic and inquiries from the Detroit district are indicative of a slowing down in buying. This trend however, is seasonal and should not cause undue apprehension. In fact, the bulk of the new machinery needed by the automotive industry during the first half of 1928 has been purchased and buying on a large scale is not anticipated until fall.

Most of the business placed with local builders has come from manufacturers in many different lines, the average order calling for one or two tools. The Santa Fe is reported to be ready to close in the next week for equipment on its recent list, while one or two carriers in the Southwest are inquiring for individual tools. The American Mond Nickel Co., Hyde, Pa., has closed for a heavy end-driven axle lathe.

Board of Education, Hamilton, Ohio, is considering installation of manual training equipment in a new two-story junior high school to cost \$500,000, for which plans will be drawn by F. J. Mueller, Rentschler Building, architect.

City Council, Columbus, Ohio, will carry out expansion and improvement program for municipal light and power plant and system to cost \$525,000. Work will include installation of 7500-kw. steam-electric power unit, with condensers, boilers and auxiliary equipment; automatic power substation on Nicholas Street, extensions in transmission lines and distributing system.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until April 27 for 73 propeller assemblies and 62 solid aluminum alloy blades, circular 300.

Victor Chemical Works, Inc., 343 South Dearborn Street, Chicago, has acquired 10 acres at West Nashville, Tenn., as site for new plant for production of phosphoric acid, etc., initial unit to cost in excess of \$1,000,000 with equipment.

S. H. McKay, Nashville, Tenn., city clerk, is asking bids until April 24 for two high-lift and two low-lift pumping units for municipal waterworks, with capacity of 10,000,000 gal. per day in pairs, with auxiliary apparatus. W. W. Southgate is engineer.

Ducktown Copper & Iron Co., Ducktown, Tenn., is considering rebuilding machine shop and wood-working plant at local Mary mines, recently destroyed by fire, with loss close to \$25,000 with equipment.

City Council, Union City, Tenn., is planning extensions and improvements in municipal power plant, including installation of 1000-kw. steam turbine-electric unit and accessories. A special election has been called May 10 to approve bonds.

Board of County Supervisors, Springfield, Ohio, will receive bids until April 30 for a gravel crushing plant, including power unit of at least 50-hp. capacity; also for portable bin of not less than 15 yd. capacity. Former bids were recently rejected. W. H. Sieverling, county surveyor, is in charge.

Board of Shelby County Commissioners, Memphis, Tenn., E. W. Hale, chairman, has plans for a new County workhouse at Mullins Station, near Memphis, to include a one-story machine and repair shop, one-story forge shop, one-story automobile service and repair building for motor trucks, and canning plant. Entire project will cost \$400,000. Hanker & Cairns, Court Square Building, are architects.

Board of Education, Newark, Ohio, has asked bids on general contract for a new manual arts school, to cost more than \$100,000 with equipment. Vernon Redding & Associates, Walpark Building, Mansfield, Ohio, are architects.

Columbus Structural Steel Co., Columbus, Ohio, is now structural department of International Derrick & Equipment Co., Columbus.

Milwaukee

MILWAUKEE, April 16.

MACHINE-TOOL demand is maintaining the relatively satisfactory rate of March, and with new inquiry most makers are expecting a favorable volume during the current month. Orders being booked are at least offsetting deliveries and production schedules are kept fairly even. Automotive industries, while not buying heavily or in lots, are furnishing a fair quantity of business, although at this time each year the bulk of requirements usually has been filled, except for replacements and unexpected needs.

George J. Meyer Mfg. Co., 598 Clinton Street, Milwaukee, has acquired buildings and real estate of Worthington Pump & Machinery Corporation, Cudahy, for about \$250,000. Meyer company, which manufactures machinery for brewers, bottlers and dairy plants, has not indicated what disposition it intends to make of property, which consists of 27 acres and buildings aggregating 500,000 sq. ft. Worthington plant, formerly known as Power & Mining Machinery Co., was abandoned about four years ago, when equipment was purchased by Allis-Chalmers Mfg. Co.

Badger Meter Mfg. Co., 841 Thirtieth Street, Milwaukee, manufacturer of water meters, is taking bids through Martin Tullgren & Sons, architects, 20 Prospect Avenue, local, for erection of an extension, 60 x 120 ft., to be used as foundry addition and carpenter shop. A light crane is included in equipment for which inquiry is being made. An investment of \$50,000 is planned.

Racine Screw Works, Racine, Wis., whose plant at Fifteenth and Clark Streets was destroyed by fire Feb. 25, is preparing to begin active production, following completion of reorganization. Jerome J. Ritter is retiring. Albert O. Falkenrath will continue as president, with other officers to be chosen from new interests entering corporation. A factory building probably will be leased or purchased. Complete new equipment, consisting largely of automatic screw machines, will be acquired.

Delta Mfg. Co., 658 Third Street, Milwaukee, manufacturer of metal specialties, is awarding contracts for erection of a new shop, 40 x 90 ft., costing about \$35,000. Architect is F. F. Drolshagen, 82 East Wisconsin Avenue, local.

Wisconsin Power & Light Co., 16 North Carroll Street, Madison, Wis., is starting erection on a work shop, garage and storage building, 50 x 60 ft., two stories, at Berlin, Wis. Kramp Construction Co., Berlin, is general contractor, and architects are Balch & Lippert, Madison.

Kenosha Brick Co., Route 3, Kenosha, Wis., is preparing to erect new dry kilns, kiln sheds and other facilities for developing a new clay depository near Kenosha. Investment will be about \$75,000.

Board of Industrial Education, Manitowoc, Wis., is taking steps toward establishment of a vocational training school to cost \$250,000, as recommended by Wisconsin State Board. Work is expected to start next fall. Otto H. Senglaub is president, and A. L. Nimz, director.

Common council, Waukesha, Wis., has approved plans by Alvord, Burdick & Howson, engineers, 8 South Dearborn Street, Chicago, for new sewage disposal plant and has authorized bond issue of \$190,000 to cover cost. Bids on plant and equipment will be requested shortly. Morgan R. Butler is mayor.

B & B Mfg. Co., Racine, Wis., has been incorporated with \$30,000 capital stock to manufacture tools, dies, jigs, fixtures,

etc., and is establishing local plant at DeKoven Avenue and Chicago & North Western tracks. Principals are Clem S. Bonin and Ernest C. Bruce.

Madison-Kipp Corporation, Madison, Wis., has purchased mechanical force feed lubricator division of Detroit Lubricator Co., Detroit. Latter company will continue manufacture of hydrostatic type lubricators and locomotive force feed lubricators. Equipment involved in purchase will be removed to Madison where new line will be handled.

Husky Wrench Co., Milwaukee, maker of automotive and industrial tools, has completed arrangement with J. H. Williams & Co., Buffalo, whereby combination wrench sets composed of Williams Superrenches and Husky socket wrenches will be offered to trade. Combination has been arranged only for selling purposes and will not affect management of either company.

Pacific Coast

SAN FRANCISCO, April 11.

NEGOTIATIONS are under way by Continental Can Co., 155 Montgomery Street, San Francisco, for property at Sacramento, Cal., as site for new plant to cost in excess of \$500,000 with equipment. Headquarters are at 1 Pershing Square, New York. Project will be carried out in conjunction with canning plant of California Co-Operative Producers, Inc., foot of Fourteenth Street, Oakland, Cal., at same location, to cost approximately \$300,000 with machinery.

Dahlstrom Metallic Door Co., 3350 East Slauson Avenue, Los Angeles, has awarded general contract to William P. Nell Co., 4814 Loma Vista Avenue, for a one-story addition.

Floco Motors Corporation, Los Angeles, recently organized by Frank L. Odenbrite, 138 West Seventeenth Street, and associates, with capital stock of \$1,000,000, is planning erection of new works for manufacture of automobiles. Property is being secured near city. Initial unit will be one story, 100 x 150 ft., and will be supplemented with other buildings.

Officials of Pacific Lumber Co., Scotia, Cal., are completing plans for construction of a pulp and paper mill near its redwood lumber mills, to utilize waste from that plant for raw material supply. Initial plant is reported to cost in excess of \$900,000 with machinery. Application has been made to use water in this section for power supply.

Hofius-Ferris Equipment Co., Spokane, Wash., manufacturer of mechanical equipment, has filed plans for a new plant, consisting of main unit, one story, 90 x 180 ft., with machine shop, 35 x 80 ft., office building and warehouse, to cost close to \$45,000. An overhead traveling crane will be installed.

Great Northern Railway Co., Hilyard, Wash., is planning to rebuild portion of local locomotive repair shops destroyed by fire April 2, with loss reported in excess of \$80,000 with equipment. Headquarters are at St. Paul, Minn.

Pacific Power & Light Co., Portland, is planning extensions and improvements in power substations and transmission lines in Lewiston-Clarkson, Idaho, district, to cost approximately \$90,000.

Brunswick-Balke-Collender Co., Los Angeles, manufacturer of talking machines and parts, billiard tables, etc., has asked bids on general contract for a one-story plant, 177 x 320 ft., to cost approximately \$100,000 with equipment. A boiler plant will be built. Headquarters are at 623 South Wabash Avenue, Chicago. John P. Kempel and Walter E. Erkes, Bank of Italy Building, Los Angeles, are architects.

Board of County Supervisors, Hall of Records, Los Angeles, has filed plans for a new repair and maintenance shop for road and other equipment to cost \$50,000.

Cyclone Fence Co., Waukegan, Ill., subsidiary of United States Steel Corporation, has purchased Standard Fence Co., Oakland, Cal., and Northwest Fence & Wire Works, Portland, Ore. These two companies have heretofore been Pacific Coast agents of Cyclone Fence Co.

Walworth Oregon Co., M. L. Kline Co., Bowles Co., and Peerless Pacific Co., all of Portland, Ore. have merged and will operate under name of Consolidated Supply Co.

Republic Supply Co. of California, Los Angeles, has purchased Associated Supply Co., local distributor of oil well supplies, particularly products of Youngstown Sheet & Tube Co. Business of two companies will be consolidated and Republic company will act as distributor in California for tubular goods made by Youngstown company.

Barde Steel Co., Seattle, will erect three two-story warehouses, 37 x 120, 32 x 120 and 67 x 120 ft., respectively.

Balzer Machinery, Portland, has been appointed representative in that territory for Gardner-Denver Co., maker of portable air compressors and rock drills. Latter company was recently formed by merger of Gardner Governor Co., Quincy, Ill., and Denver Rock Drill Co., Denver.

Seattle office of Crouse-Hinds Co., maker of electrical

equipment, has been closed, and business will hereafter be handled through its San Francisco office.

Franklin Iron Works Co., Inc., Mount Vernon, Wash., has changed its name to Franklin Steel & Machinery Co.

Indiana

INDIANAPOLIS, April 16.

PROPERTY of Davis Motor Car Co., Richmond, has been acquired by Automotive Corporation of America, Inc., lately organized, which will take over and expand plant. Production of motor cars will be continued and in addition new owner will provide facilities for manufacture of four-wheel jacking and parking device, parkmobile attachments and other accessory equipment. W. E. Byrd is president of purchasing company.

Indiana Refining Co., Lawrenceville, Ill., has plans under way for a two-story oil storage and distributing plant at Fort Wayne, to cost about \$55,000 with equipment. A similar plant will be constructed at Terre Haute, Ind., to cost close to a like amount.

Board of Trustees, Indiana University, Bloomington, has plans for steam power plant, to cost \$140,000 with equipment. C. R. Ammerman, Continental Bank Building, Indianapolis, is engineer, and bids will be asked from last-noted office.

Belden Mfg. Co., 2300 Western Avenue, Chicago, manufacturer of electric wires, cables, etc., is having plans drawn for second unit at new plant at Richmond, to cost more than \$60,000 with equipment. J. W. Muller, First National Bank Building, Richmond, is architect.

Glenn Locomotive Co., recently formed by John S. Glenn, Sr., Cincinnati, and associates, with capital stock of \$200,000, has taken over portion of plant of Interstate Car & Foundry Co., 3823 Massachusetts Avenue, Indianapolis, for repair and reconditioning of locomotives. Boiler shop, machine shops, forge and blacksmith shop, pipe shop, wood-working shop and other departments will be operated. A plant formerly operated at Cincinnati will be discontinued.

International Harvester Co., 606 South Michigan Avenue, Chicago, is reported planning a factory branch and distributing plant at Fort Wayne, to cost in excess of \$350,000 with equipment.

Hare Motor Sales Co., 210 West Fourth Street, Bloomington, has asked bids on general contract for two-story service, repair and sales building, to cost \$70,000 with equipment.

Foreign

BIDS are being asked by State Electricity Commission, 22-32 William Street, Melbourne, Australia, until Sept. 3, for switchgear for Yallourn power scheme, comprising 120,000-volt switchgear equipment for Richmond Terminal station, specification No. 28/20; and 135,000-volt switchgear for Yallourn power station extension, specification No. 28/21. Specifications available at offices of Bureau of Foreign and Domestic Commerce, Custom House, New York, and 33 South Clark Street, Chicago.

Electric Power Corporation (Elektrowerke Aktiengesellschaft), Berlin, Germany, is disposing of a bond issue of \$5,000,000 in United States, a portion of fund to be used for extensions and improvements, including completion of

Branch Office Representatives of The Iron Age

Editorial

| | |
|---|----------------|
| Chicago, Otis Bldg..... | R. A. Flsko |
| Pittsburgh, Park Bldg..... | G. F. Tegan |
| Cleveland, 1362 Hanna Bldg..... | F. L. Prentiss |
| Cincinnati, 408 Union Central Bldg..... | Burnham Finney |
| Boston, Park Square Bldg..... | Gerard Frazar |
| Washington, 536 Investment Bldg..... | L. W. Moffett |

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new steam-operated electric power plant stations with capacity of 80,000 kw. and transmission line construction.

Plans are being arranged for a new cellulose and paper mill in vicinity of Ussuri Station, Siberia, to be operated under direction of Russian Soviet Government. Plant is estimated to cost close to \$5,000,000 with machinery. American-Russian Chamber of Commerce, 50 Broad Street, New York, has information regarding project.

Municipal Council, Johannesburg, South Africa, has authorized fund of £510,000 (about \$2,448,000) for a municipal electric light and power plant, with initial output of 39,000 kw. American Consulate, C. H. Hall, Jr., Johannesburg, has information regarding project.

Soviet Southern Ore Trust, operating in Yurt mining district, Russia, has an appropriation of \$9,000,000 for capital construction during 1928, and will increase plants for production of iron ore and manganese. Representatives of Trust, headed by A. N. Bakhtiarov, chief engineer, are now on a visit to United States to investigate methods of production and mining machinery. Purchases of equipment will be made through Amtorg Trading Corporation, 165 Broadway, New York, official buying agency for Russian Soviet Government, and delegation Trust will make headquarters at that office.

A company in Norway is planning construction of new plant for production of nitrate of lime, ammonia, soda and kindred products, including sulphuric acid. Large expenditure will be made for machinery. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Norway No. 272193; also, at American Consulate, Oslo, Norway, Louis G. Dreyfus, Jr., consul general.

Canada

TORONTO, April 16.

MACHINE tool sales throughout the Dominion are being maintained at a good level. Sales for the week ranged from one to two tools to an order and were in fairly large volume. Present purchases are mostly for replacement, although there is also some buying for automobile repair shops and garages and for other small shop installation. The Canadian National Railways, which will start work soon on additions to its shops at Point St. Charles, will require a large number of tools, as well as equipment for an electric plant there.

The Steel Co. of Canada, Ltd., Hamilton, Ont., will make further extensions to its plant for which tools and general equipment will be purchased later in the year. Small tool sales have shown considerable improvement since the first of the year.

Bids are being received by T. T. Irving, regional chief engineer, Canadian National Railways, New Union Station, Toronto, for addition to shops at Point St. Charles, Montreal.

Chrysler Corporation of Canada, Ltd., Box 249, Windsor, Ont., has started work on an addition to its plant which is expected to be completed by May 15. It will be two stories, 100 x 400 ft.

T. Strachan, president of General Metal Devices, Ltd., Oakville, Ont., is calling for bids for erection of a plant, 60 x 300 ft. Company will manufacture electrical fixtures, etc.

International Nickel Co., Sudbury, Ont., in connection with its building and development program, has awarded contract to Fraser Brace & Co., for construction of its entire surface plant, on which work will be started immediately.

Plant of Canadian Edge Tool Co., Galt, Ont., was destroyed by fire following an explosion. It was recently acquired by Rae Machine Co., Hamilton, Ont.

Plant of Canada Brass Co., Merrickville, Ont., was totally destroyed by fire with loss of \$30,000.

Shawinigan Engineering Co., Ltd., Shawinigan Falls, Que., is contemplating construction of a power plant at Shawinigan Falls to cost \$30,000.

McEachren Construction Co., 244 Ridout Street, London, Ont., has contract for erection of a \$35,000 addition to plant of Empire Brass Mfg. Co., Ltd., Dundas Street East, London. Architects are Watt & Blackwell, Bank of Toronto Chambers, London. Building will be two stories and basement, 40 x 60 ft.

Western Canada

Cork Province Mines, Ltd., has awarded contract to Bartholomew, Montgomery & Co., engineers, Vancouver, B. C., for installation of a hydroelectric plant to cost \$60,000, to take care of increased mine and mill requirements. Construction work will be started immediately. Contract also includes erection of a substation adjoining mill.

City Council, Prince Albert, B. C., plans addition to powerhouse to cost \$100,000. Installation will include new turbine, mechanical overhead feeds and two new boilers.

Bids will be received until May 8 by S. E. O'Brien, secretary, Department of Public Works, for one 4-ton electric traveling crane for Assembly Wharf at Port Alberni, B. C. Tenders can be secured at office of district engineer, Post Office Building, Victoria, B. C., and at Post Offices, Vancouver and Port Alberni, B. C.

Winnipeg Electric Co., Winnipeg, Man., will erect a terminal station to cost approximately \$750,000 to take care of production of Seven Sisters Falls development. It will have a capacity of 50,000 hp., with provision for doubling that amount.

NEW TRADE PUBLICATIONS

Pneumatic Coal Separators.—American Coal Cleaning Corporation, Welch, W. Va. Bulletin 28 of 12 pages illustrates and describes pneumatic coal separators operating under the Sutton, Steele and Steele patents. The process is described in some detail, with a number of drawings and photographic reproductions. The company is distributing also a pamphlet on the cleaning of coal, with special reference to pneumatic separation, which has been reprinted from the Journal of the Society of Chemical Industry (Great Britain).

Compensated Draft.—Hagan Corporation, Pittsburgh. Bulletin 104 of 12 pages is devoted to the Hagan system of automatic control of forced-draft stoker-fired boilers. It is illustrated with line drawings showing methods of control, and giving curves and chart diagrams indicating practice.

Speed Recorder.—Esterline-Angus Co., Indianapolis. Four-page folder illustrating and describing a speed recorder for steam turbine use. Annotated chart shows the use of the recorder.

Eye Comfort.—Curtis Lighting, Inc., 1119 West Jackson Boulevard, Chicago. Loose-leaf folder of several pages devoted to the subjects of shadows, lights and settings of lights to avoid shadows, and the general subject of guarding against eye-strain from improperly installed lighting equipment.

Pulverizing Machinery.—Abbé Engineering Co., 30 Church Street, New York. Bulletin 23, describing pulverizing, grinding and mixing machinery manufactured by company. Included are jar, laboratory, pebble, ball, tube and attrition mills, rotary cutters, crushers, and disintegrators.

Refractory Materials.—Laclede-Christy Clay Products Co., 1711 Ambassador Building, St. Louis. Leaflet dealing briefly with Laclede fire bricks for various refractory purposes.

Wrenches.—Husky Wrench Co., Milwaukee. Catalog 28, listing the Husky line of interchangeable socket wrenches and soft tap hammers.

Refractory Guns.—Quigley Furnace Specialties Co., Inc., 26 Cortlandt Street, New York. Bulletin 301, dealing with Bitumen guns, an adaptation of the Quigley refractory gun, for shooting hot or cold materials as a protective coating on metal, concrete, stone, brick, wood, cork or other surfaces.

Cranes and Shovels.—Universal Power Shovel Co., Detroit. Bulletin 6, an engineering, sales and service manual, describing the construction and uses of the Wilford line of shovels, trench hoes, clamshells, cranes, draglines and backfillers.

Industrial Fencing.—Cyclone Fence Co., Waukegan, Ill. Catalog 101, 64 pages, describing with many illustrations the uses of various types of industrial, municipal and residential fences manufactured by the company.

Transmission Machinery.—Foote Brothers Gear & Machine Co., 215 North Curtis Street, Chicago. Catalog 68, 192 pages, listing the various types of friction clutches and transmission machinery manufactured by the company's A. Plamondon division.

Oil Burners and Preheaters.—Alexander Milburn Co., 1416 West Baltimore Street, Baltimore. Bulletin B-200D, devoted to the company's type A oil burner and preheater. Burner is of atomizing type utilizing cheap grades of fuel and requires no preheating.

Boiler Furnaces.—Erie City Iron Works, Erie, Pa. Leaflet briefly describing the Vortex furnace for applying pulverized coal to small boiler furnaces and "Some Fundamentals of Water Cooled Furnace Design," by Prof. W. J. Wohlenberg, a paper designed to provide understanding of the use of principal types of water cooled furnaces.